Maryland Public Health Strategy for Climate Change

Washington County Site Visit

Clifford S. Mitchell, MS, MD, MPH
Director, Environmental Health Bureau
Prevention and Health Promotion Administration

October 25, 2013
Hagerstown, MD

Site Visit Agenda

11:00 – 11:15 am …….Welcome/Introductions

11:15 – 11:30 am ……..Overview of Climate Change Project, Site Visit Goals

11:30 am – 12:15 pm ……..……...Discussion of Local Health Data, Priorities, Possible Contributions of DHMH Climate Change Project

12:15 – 12:30 pm ……..Environmental Health Data Portal Demonstration

12:30 – 12:45 pm ……..Next Steps

12:45 – 1:00 pm …….Wrap-Up

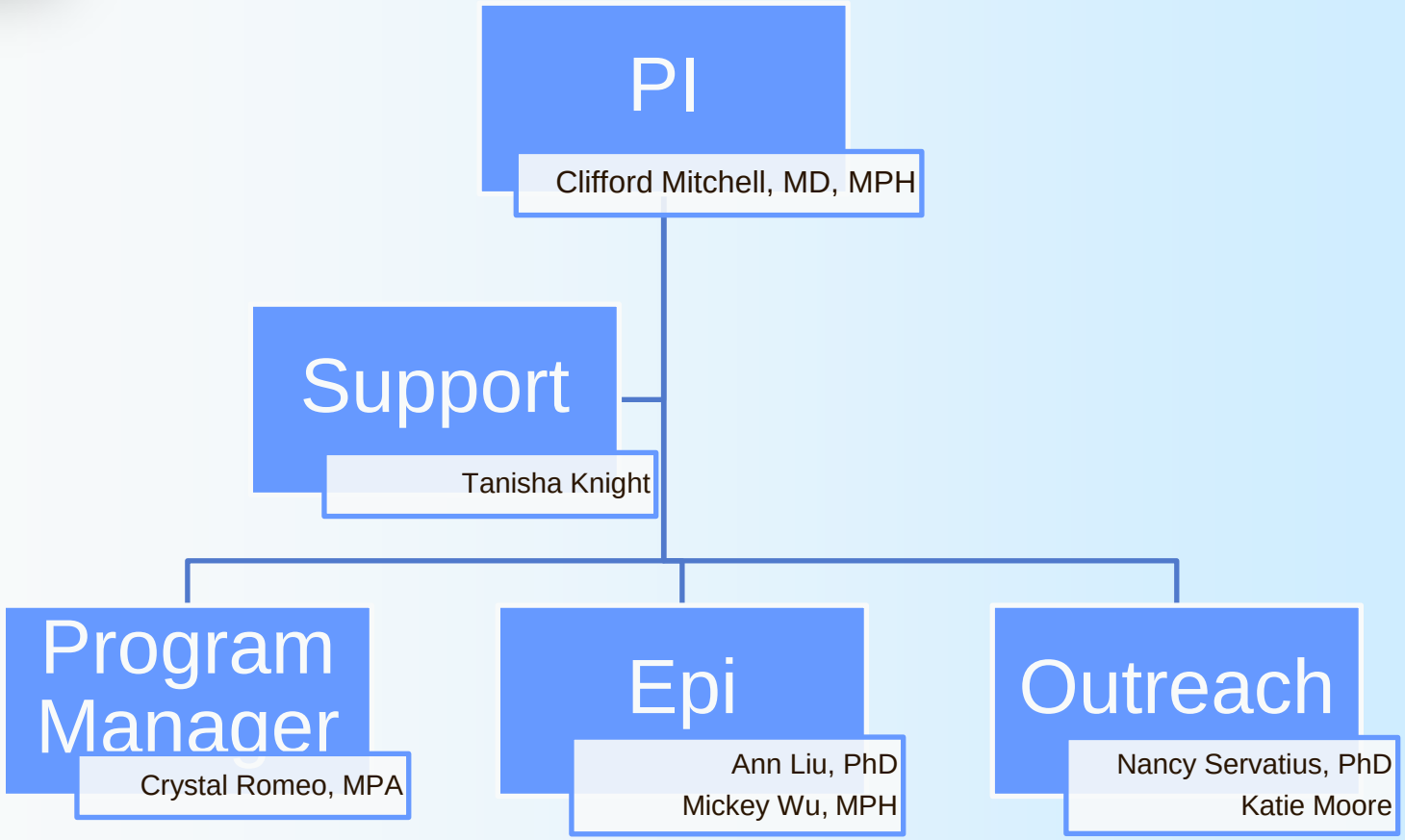
GOALS

- Review overall project
- Discuss Washington County Local Health Priorities
- Discuss ways in which climate change might affect local priorities
- Identify products (forecasts, models) that might assist WCHD in achieving its goals
- Discuss one possible regional project (asthma)

Welcome and Introductions

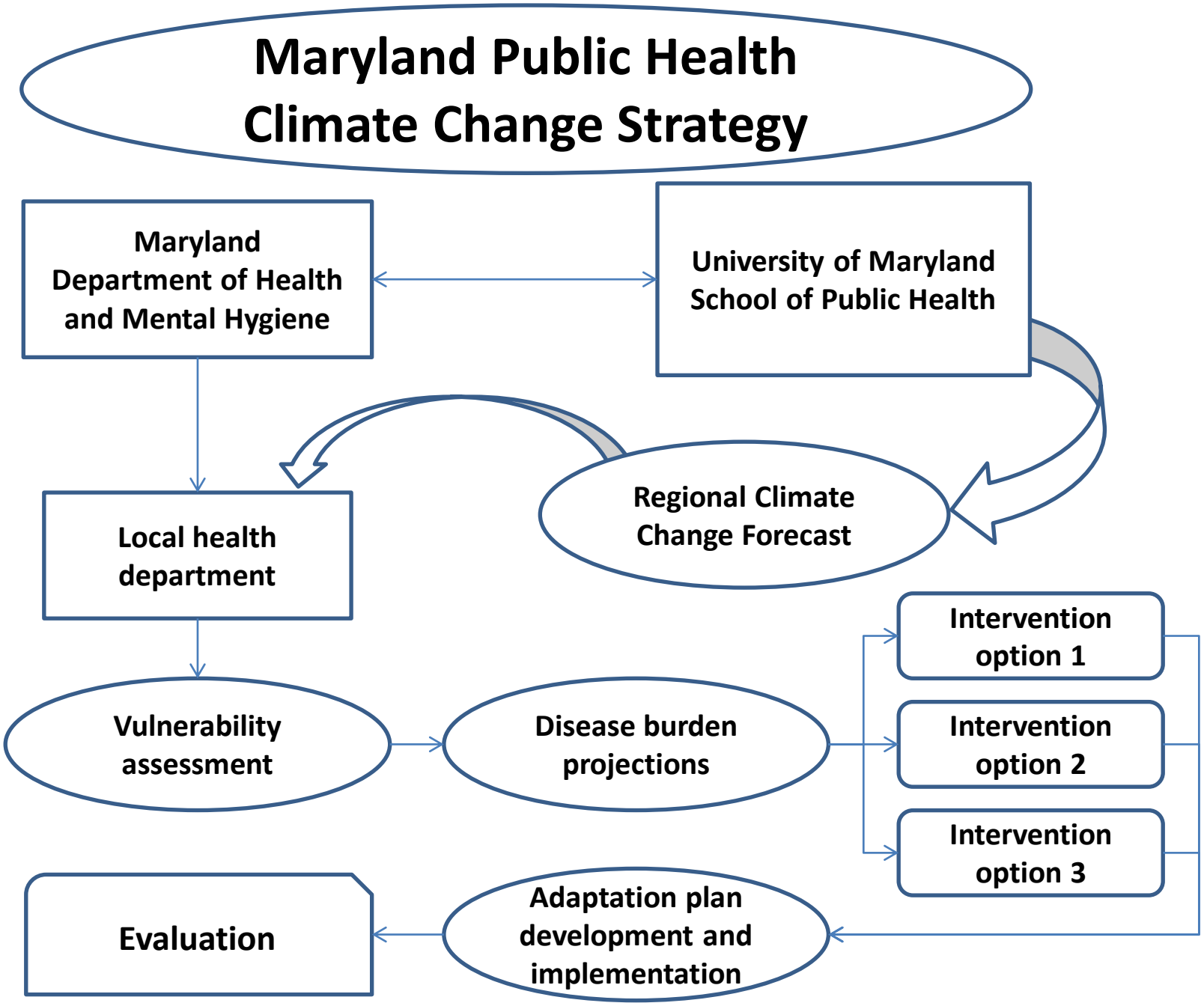
- PROJECT TEAM
  - Maryland Department of Health and Mental Hygiene
  - University of Maryland College Park
  - CDC
  - Other Partners

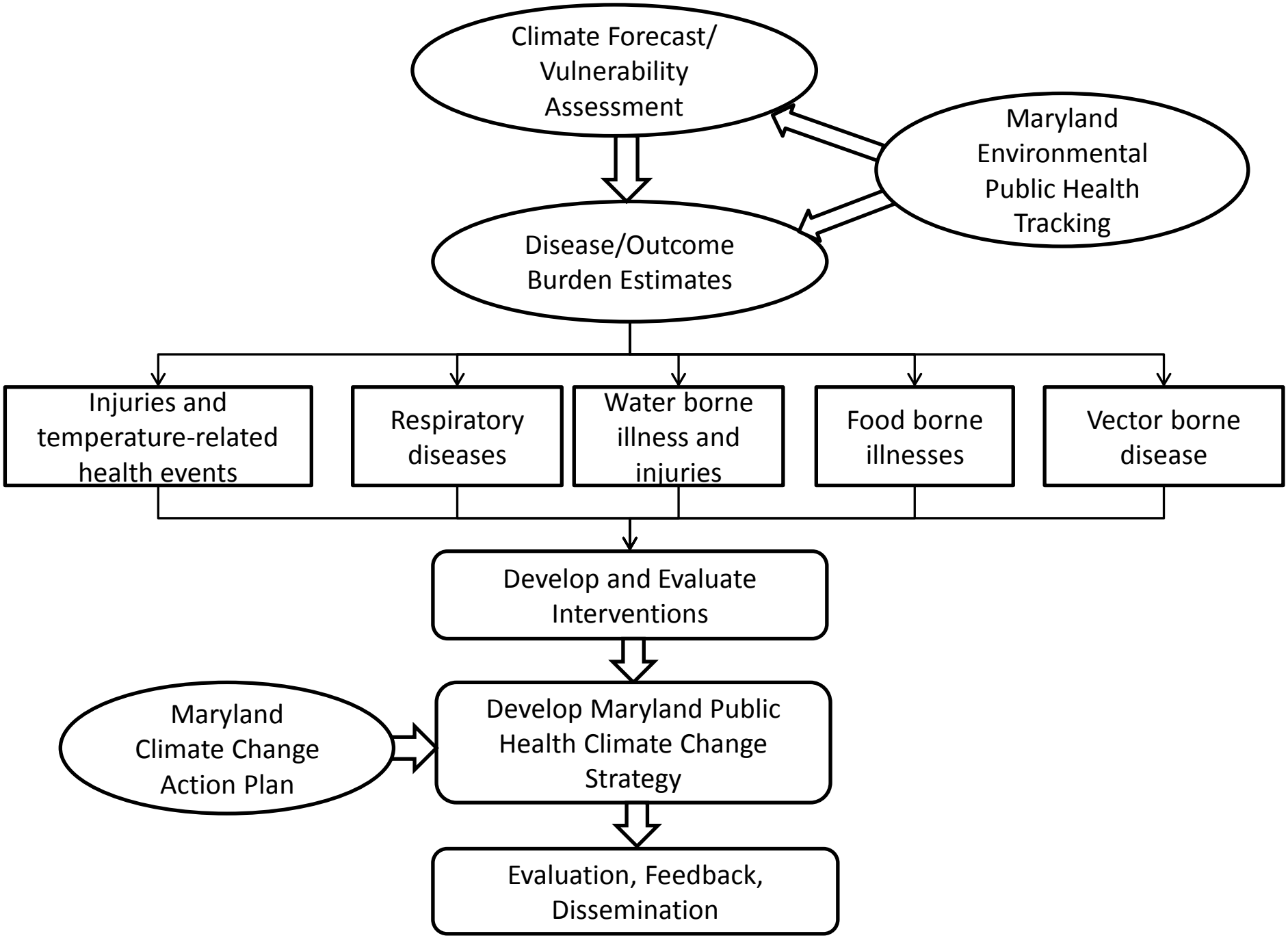
Climate Change Project



Maryland Public Health Strategy for Climate Change

- Based on CDC BRACE framework (building resistance against climate effects)
- 4 year cooperative agreement
- Also operates within context of Maryland Climate Change Action Plan


Maryland Public Health Climate Change Strategy
Maryland Department of Health and Mental Hygiene
University of Maryland School of Public Health
Regional Climate Change Forecast
Local health department
Vulnerability assessment
Disease burden projections
Intervention option 1
Intervention option 2
Intervention option 3
Adaptation plan development and implementation
Evaluation


Climate Forecast/ Vulnerability Assessment
Maryland Environmental Public Health Tracking
Disease/Outcome Burden Estimates
Injuries and temperature-related health events
Respiratory diseases
Water borne illness and injuries
Food borne illnesses
Vector borne disease
Develop and Evaluate Interventions
Maryland Climate Change Action Plan
Develop Maryland Public Health Climate Change Strategy
Evaluation, Feedback, Dissemination

Goals	Objectives	Timeline	Performance Metric(s)
1. Prepare a Climate Forecast and Vulnerability Assessment	1.1 Prepare climate forecast	9/1/2012 – 8/31/2013	Forecast products for selected regional, local jurisdictions
	1.2 Vulnerability assessment	11/1/2012 – 8/31/2013	Mapping of vulnerable populations, quantitative vulnerability assessment
2. Project Disease/ Outcome Burden	2.1 Injuries and Temperature-Related Health Events	9/1/2013 – 3/31/2014	Metrics for each selected disease or outcome
	2.2 Respiratory Diseases		
	2.3 Water Borne Illness		
	2.4 Food Borne Illness		
	2.5 Vector Borne Disease		
3. Develop and Evaluate Public Health Interventions	3.1 Develop interventions	1/1/2014 – 8/31/2014	Detailed written description of interventions
	3.2 Assessment of public health interventions using health impact assessment framework	3/1/2014 – 2/28/2015	Formal health impact assessment of strategies/ interventions
4. Develop Maryland Public Health Climate Strategy	4.1 Develop written strategy document within Maryland Climate Change Action Plan framework	3/1/2015 – 8/31/2015	Strategy document
	4.2 Obtain feedback from key stakeholders	9/1/2015 – 2/29/2016	Written feedback incorporated in strategy document
	4.3 Adopt and promulgate strategy	3/1/2016 – 8/31/2016	Promulgation on DHMH website, other media
5. Evaluation of Maryland Public Health Climate Change Strategy	5.1 Develop evaluation framework using common evaluation tools and framework	9/1/2014 – 8/31/2016	Evaluation using criteria adopted by DHMH, Maryland Climate Change Commission

Local Public Health Department Mini-grants

- Enable public health professionals in local health departments (LHDs) to utilize climate forecast projections
- Help LHDs implement climate mitigation and/or adaptation strategies necessary to protect public health
- Evaluate the mitigation and/or adaptation strategy used to determine the quality of improvement and to incorporate refined inputs

Local Public Health Department Projects

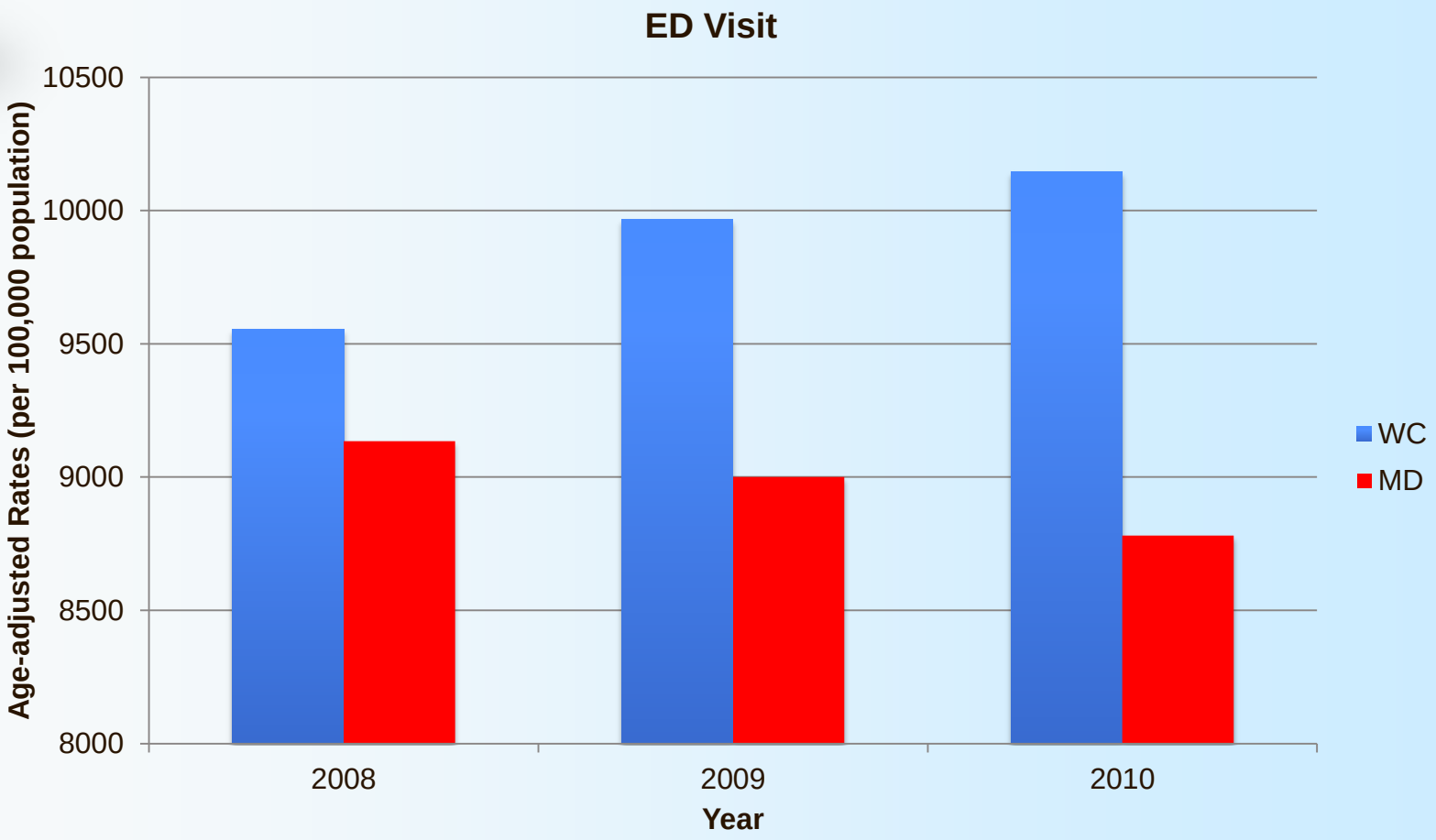
- Proposals developing in Fall, 2013
  - Baltimore City
  - Prince Georges County
  - Washington County
  - Wicomico County

Health Statistics (Washington County)

Provided by
Ann Liu, PhD, MPH
Mickey Wu, MPH
Elizabeth Young, MPH

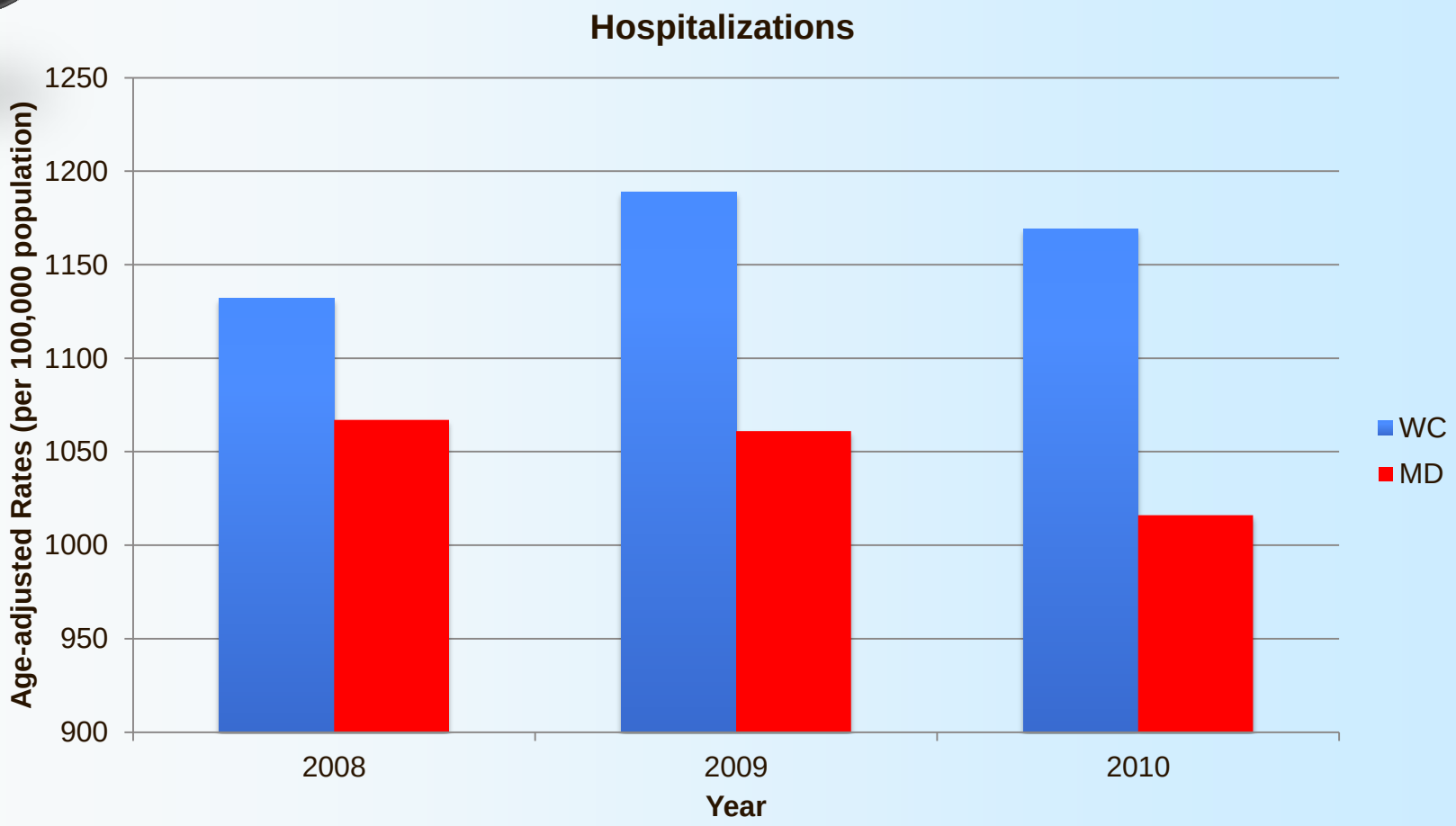
PRELIMINARY BASELINE HEALTH STATISTICS

Total Injury Rates



Data source: Injuries in Maryland: Statistics on Injury-related Emergency Department Visits, Hospitalizations, and Deaths Report (years 2008-2010*)
Age-adjusted rates of total injuries (per 100,000 population)
*Data by jurisdiction not available until 2008; report not available for 2011

Total Injury Rates



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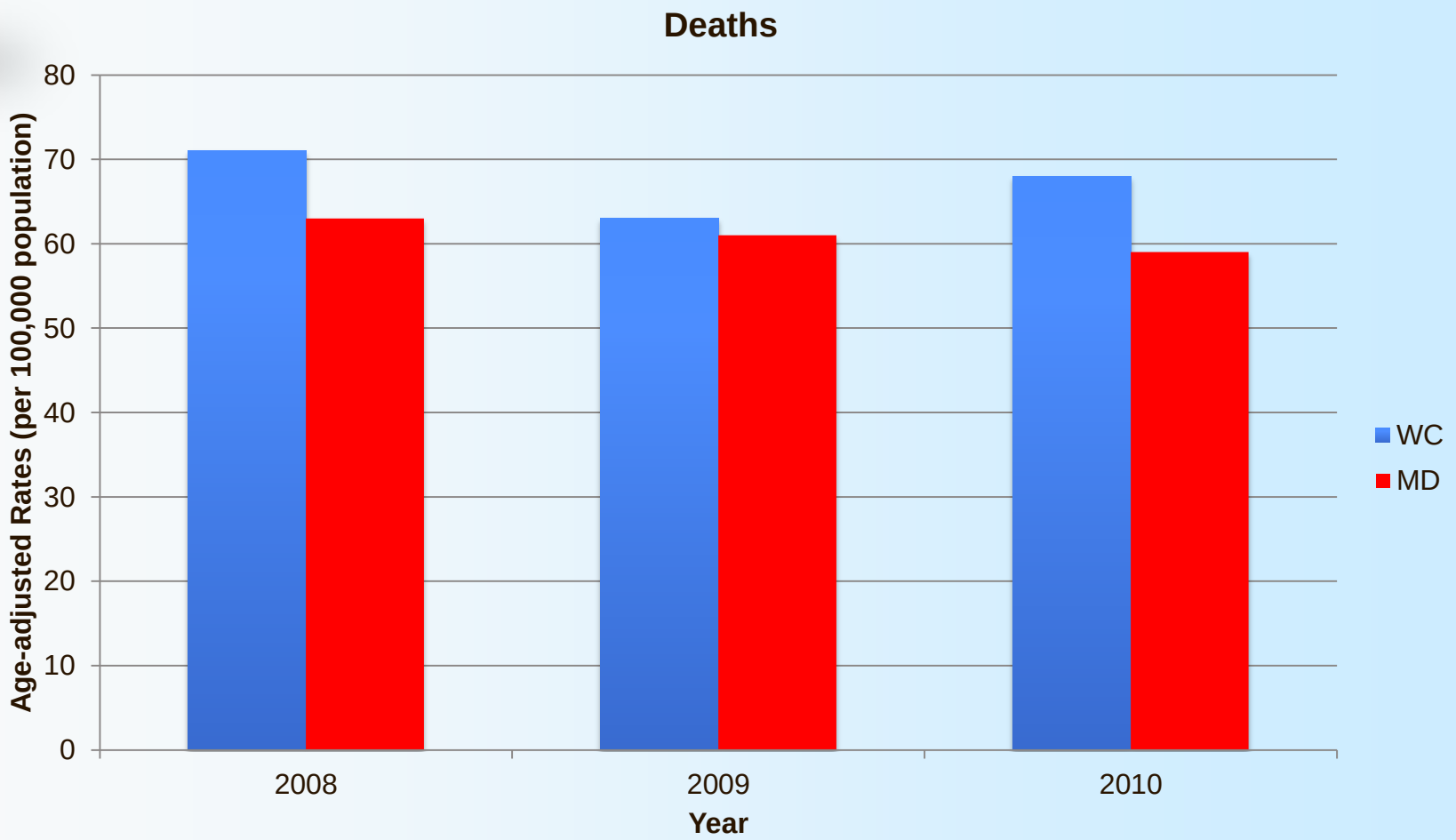

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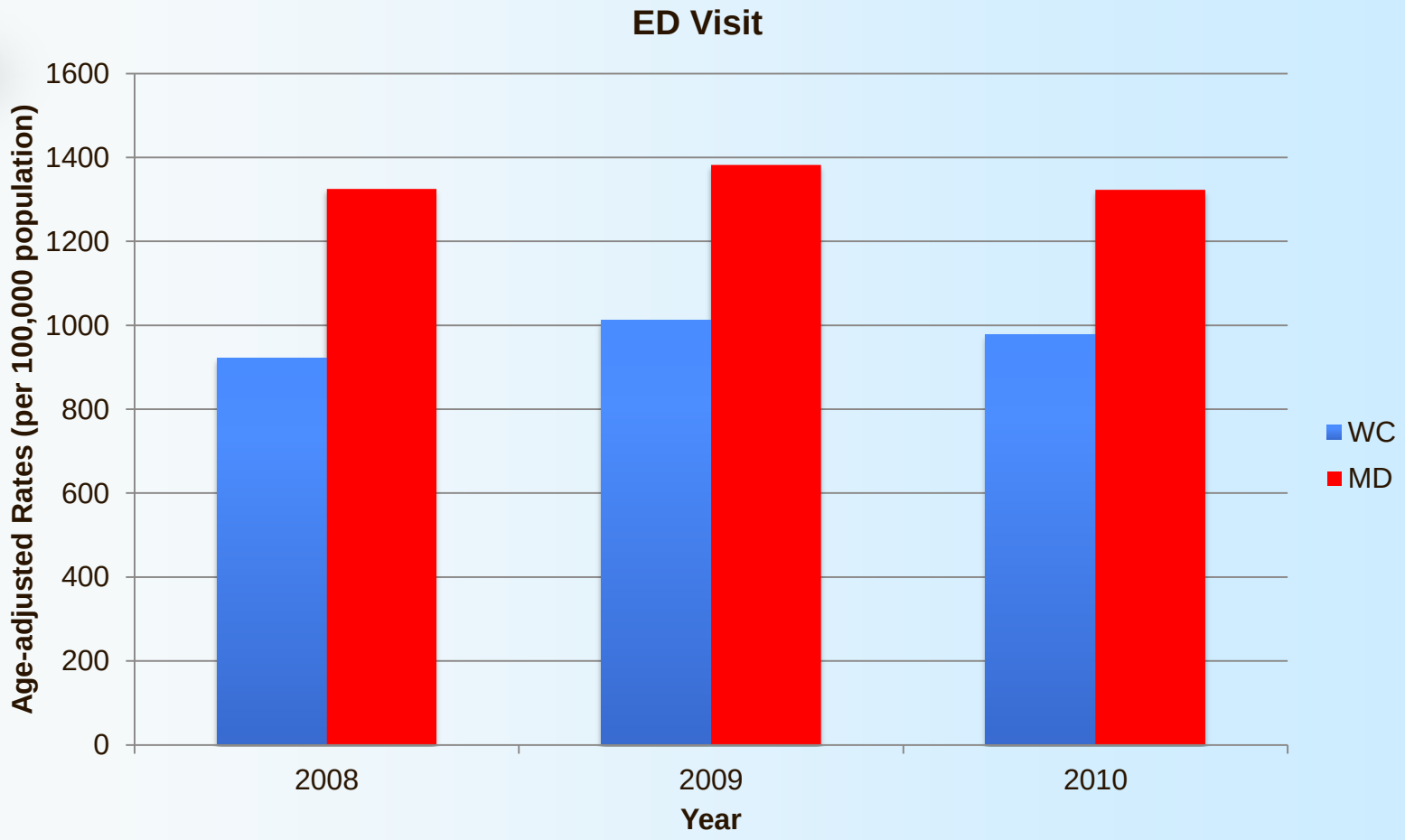
Motor Vehicle Injuries



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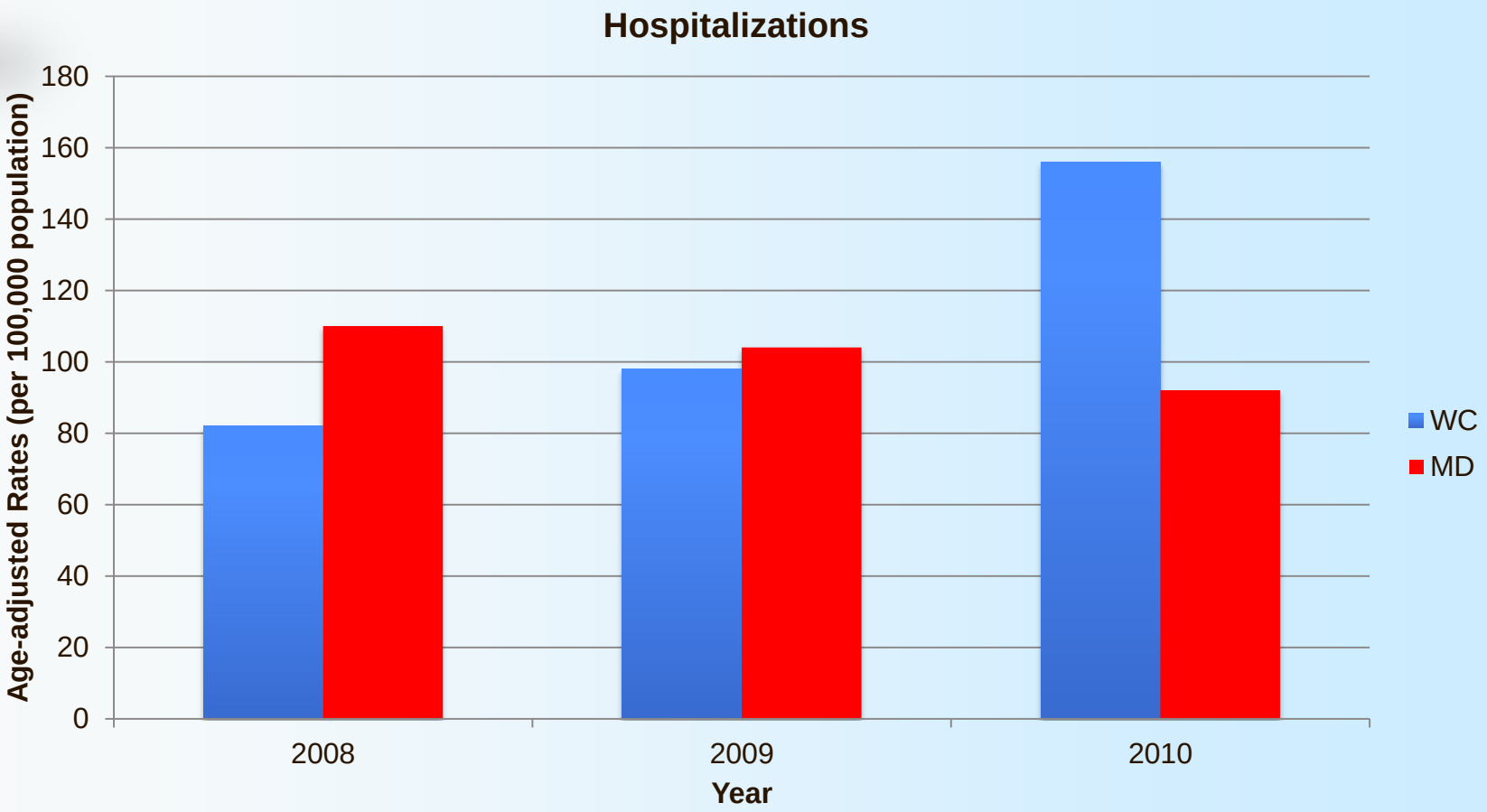

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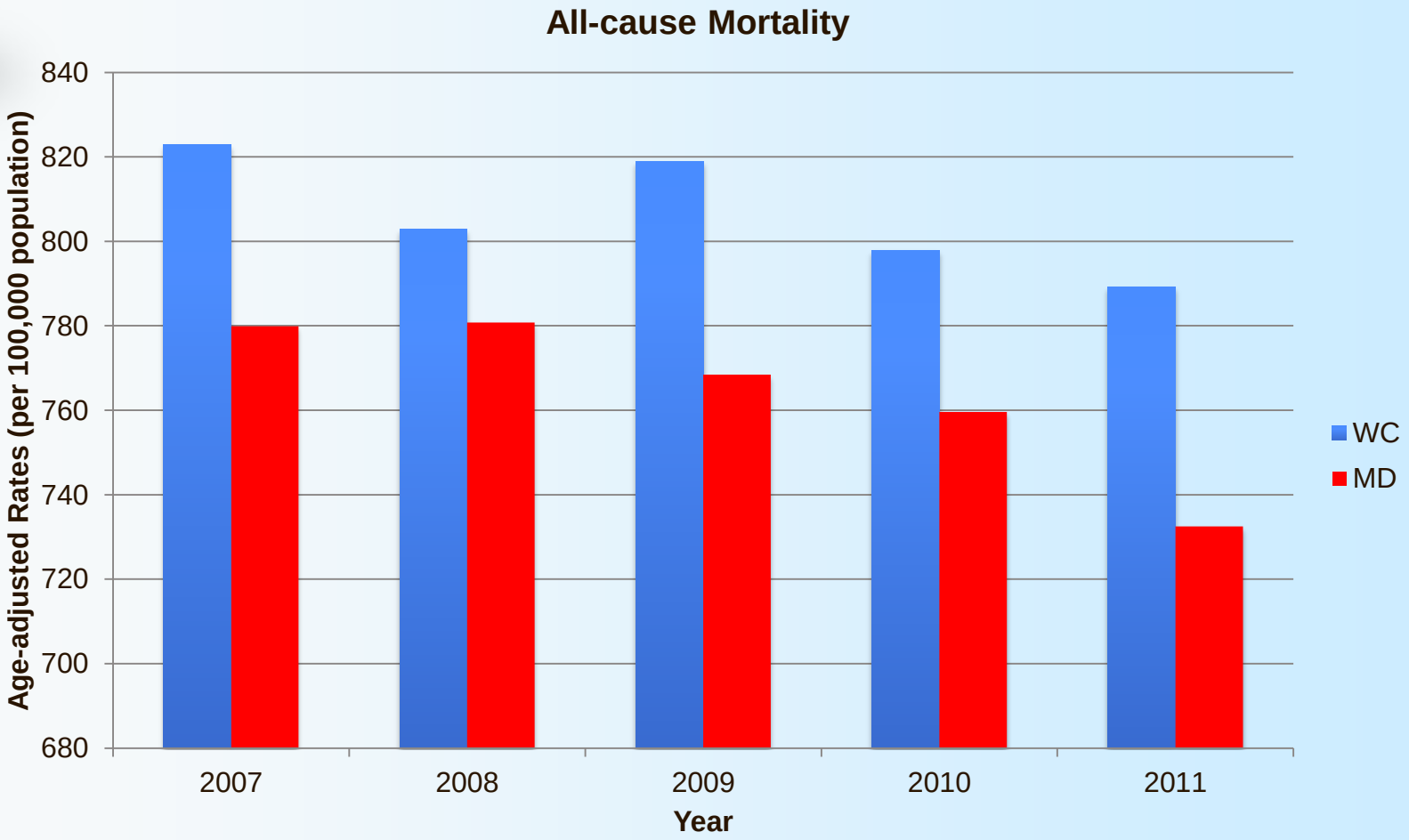
Mortality



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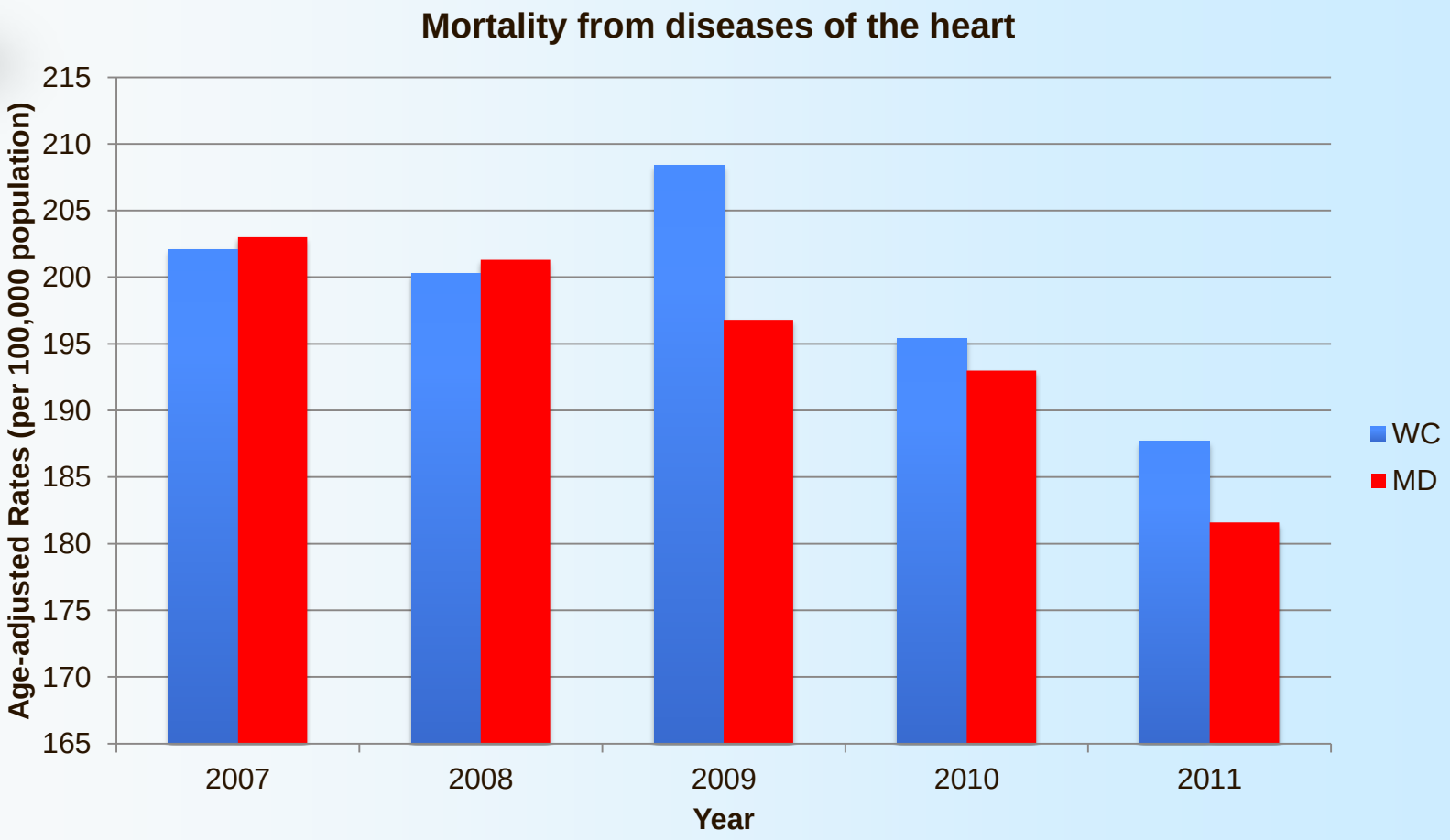

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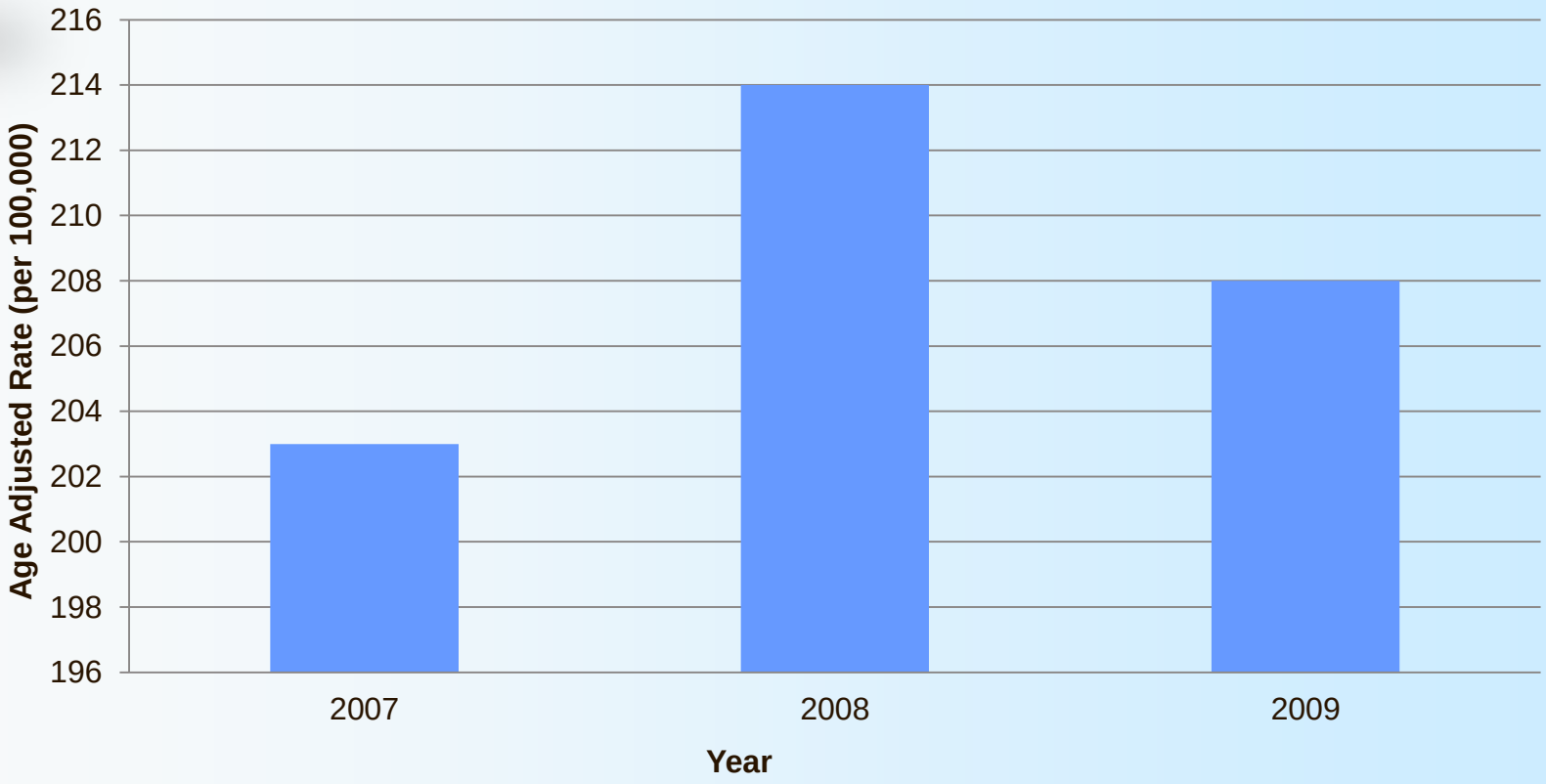
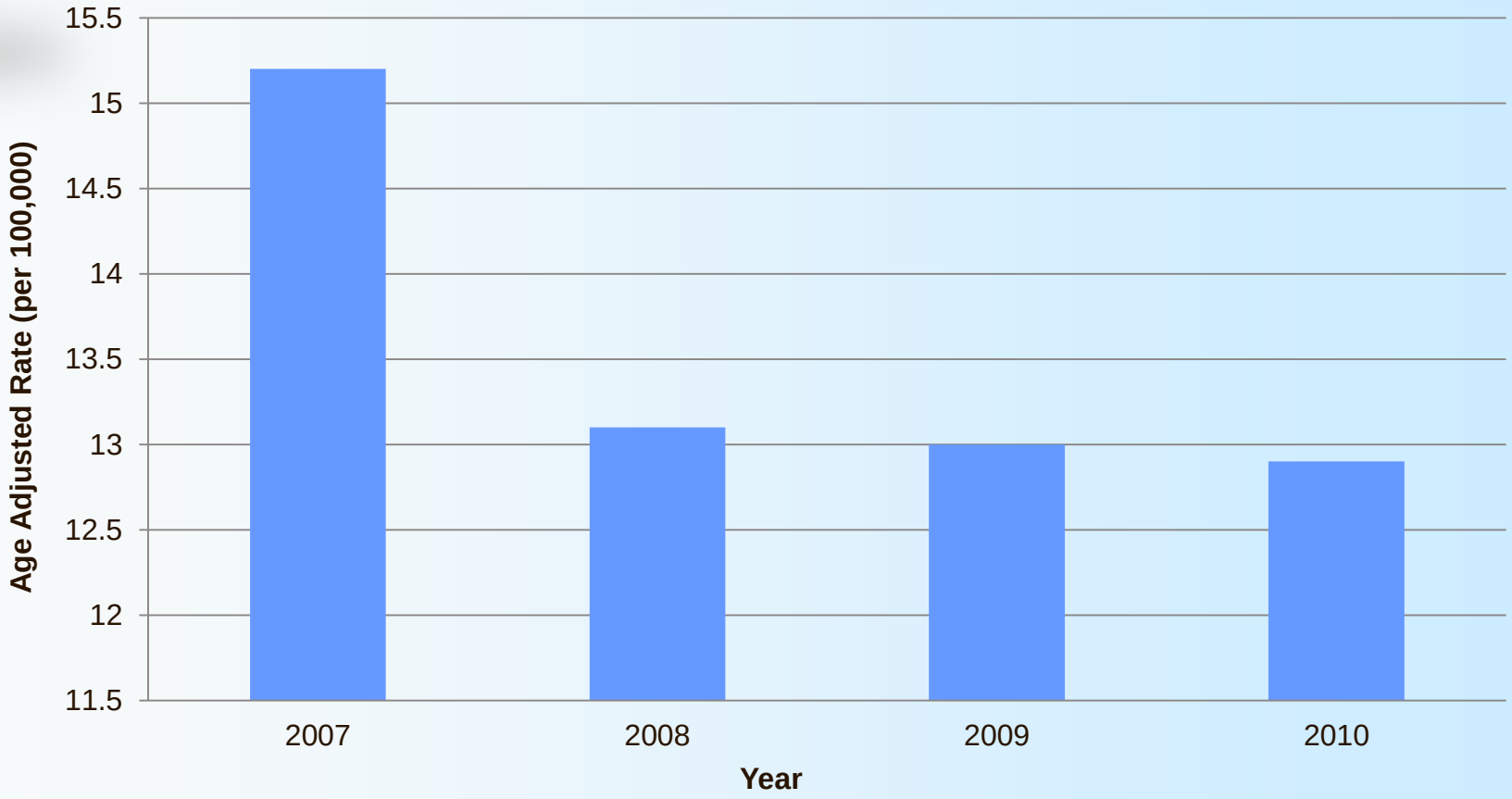
Acute MI for Washington County (ED Visits)



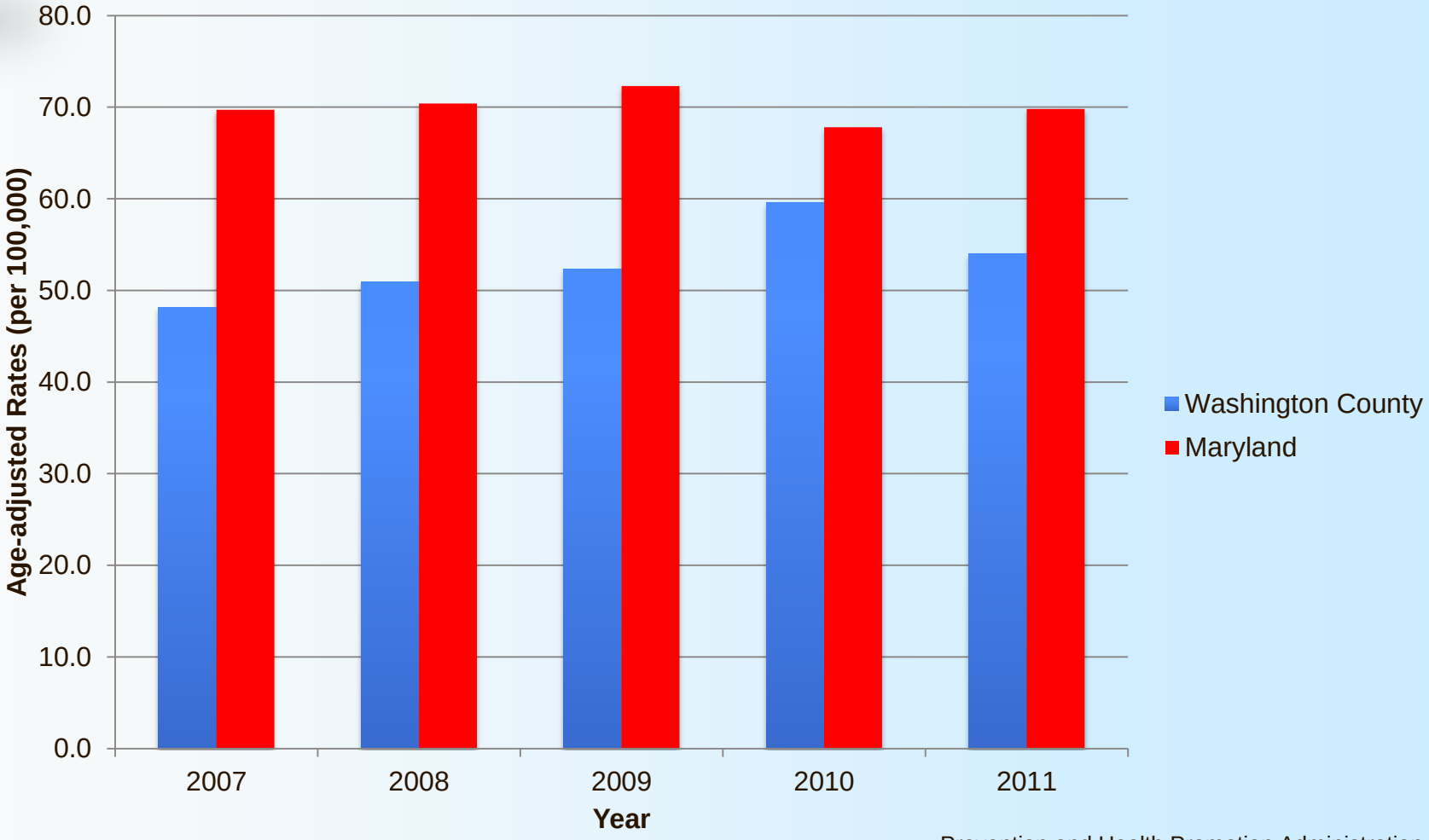
Data source: ED visits of Acute MI from DHMH EPHT: Infectious Disease and Environmental Health Administration (years 2007-2009)
http://eh.dhmh.md.gov/idehaweb/query.aspx
All rates are age-adjusted rate per 100,000 population

Heat Stress for Washington County (ED) Visits

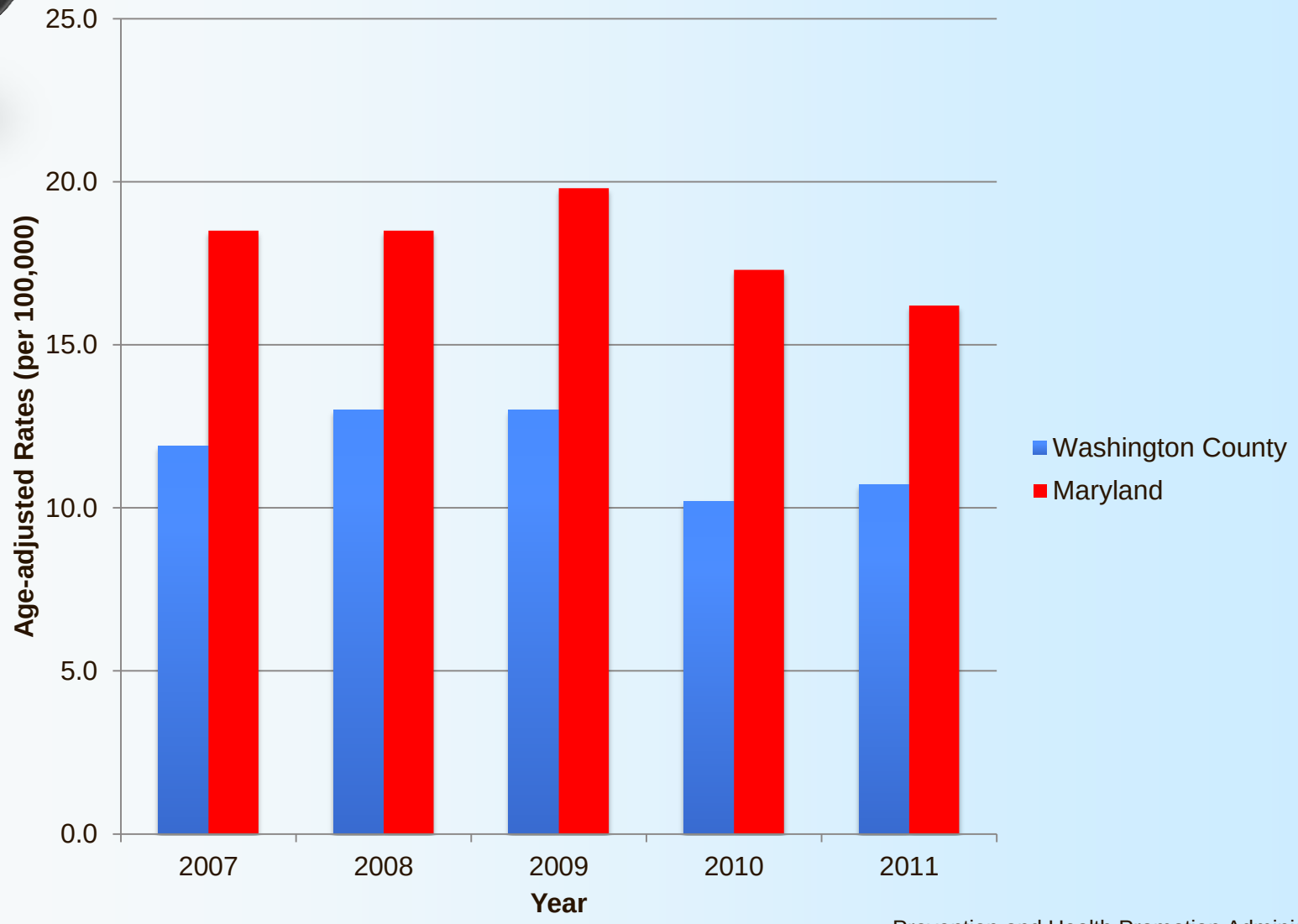


Data source: DHMH Environmental Public Health Tracking: Heat Stress Indicator
Age-adjusted rates of heat stress (per 100,000 population)

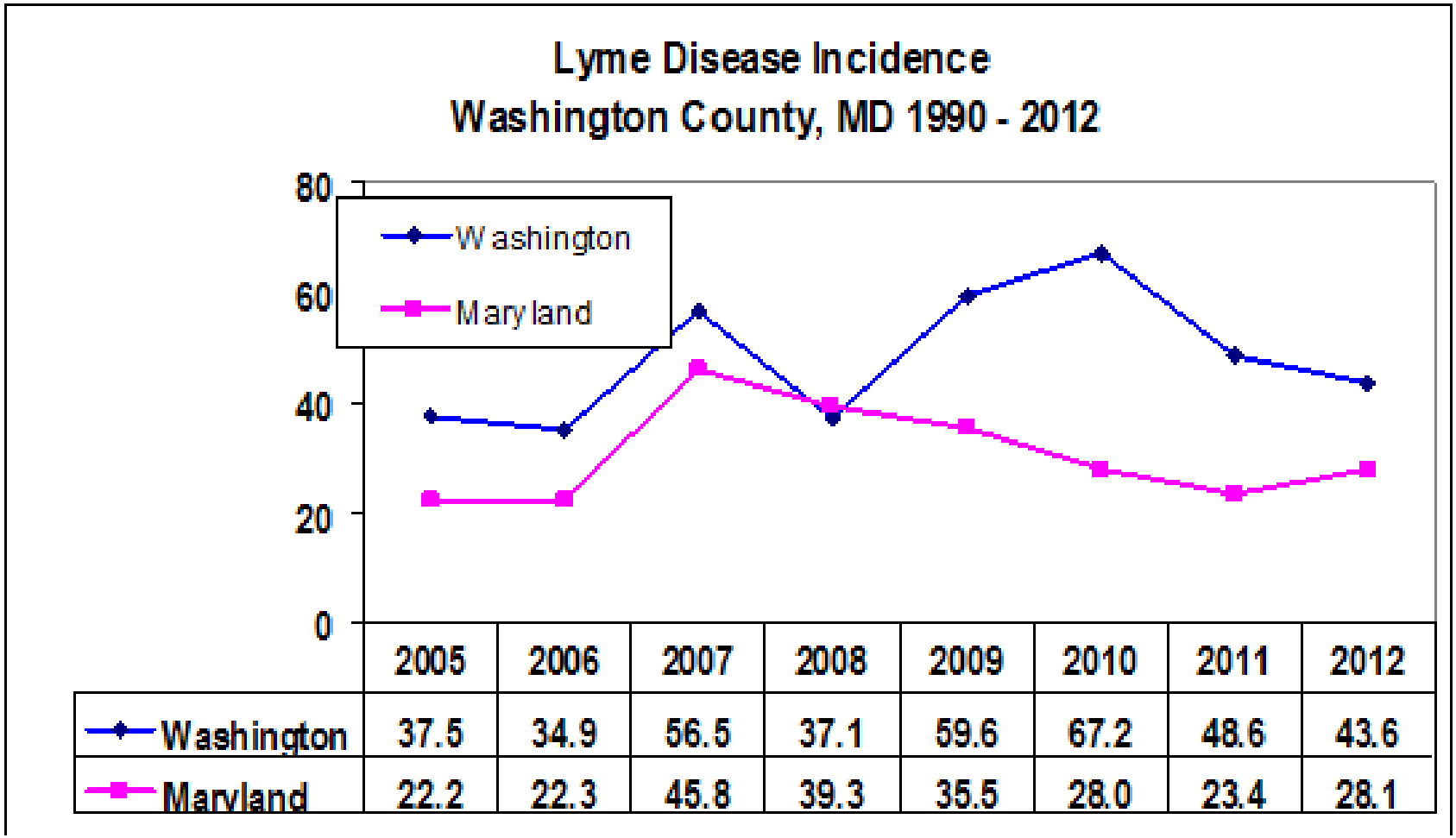
Asthma Emergency Department (ED) Visits



Asthma Hospitalizations

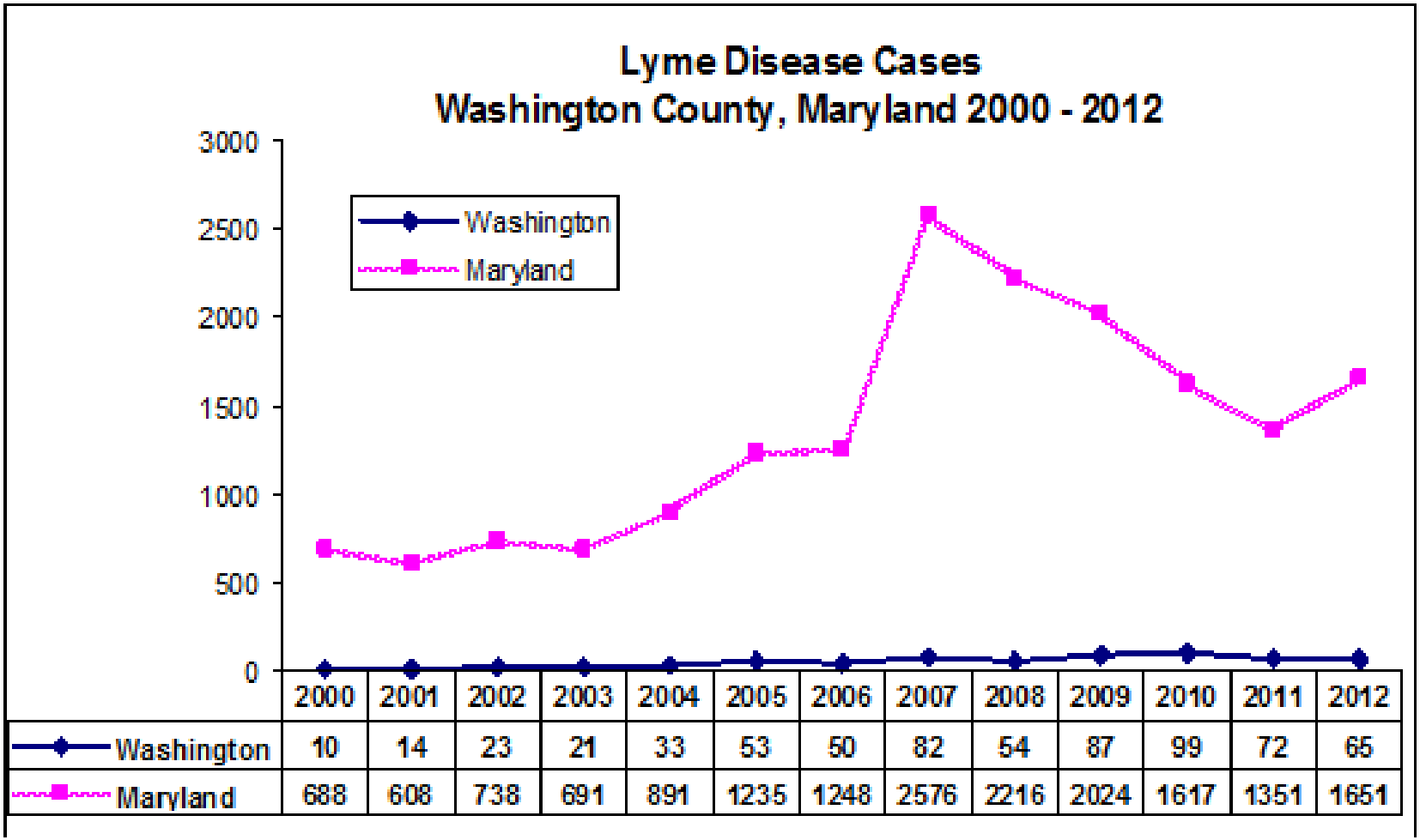


Lyme Disease Incidence



	2005	2006	2007	2008	2009	2010	2011	2012
Washington	37.5	34.9	56.5	37.1	59.6	67.2	48.6	43.6
Maryland	22.2	22.3	45.8	39.3	35.5	28.0	23.4	28.1

Lyme Disease Cases



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Washington	10	14	23	21	33	53	50	82	54	87	99	72	65
Maryland	688	608	738	691	891	1235	1248	2576	2216	2024	1617	1351	1651

County	#	SHIP Objective	Measure Description (Source)	SHIP 2011 County Baseline	SHIP 2012 County Update	SHIP 2012 Maryland Update	SHIP 2012 County Update (Race/Ethnicity)	SHIP 2012 Maryland Update (Race/Ethnicity)	Maryland SHIP 2014 Target	% Difference (Maryland vs. County)
Washington	1	Increase life expectancy in Maryland	Life expectancy at birth (VSA 2008-2009) (VSA 2008-2010)	78.1	78.2	79.3	Black--78.1 White--80.5	Black--76.4 White--80.2	82.5	-1.39%
Washington	2	Reduce infant deaths	Rate of infant deaths per 1,000 live births (VSA 2007-2009) (VSA 2008-2010)	6.1	6.4	6.7	NH white--5.0	Black--11.8 Hispanic--4.1 NH white--4.2	6.6	-5.06%
Washington	3	Reduce low birth weight births	Percentage of births that are LBW (VSA 2007-2009) (VSA 2008-2010)	7.1%	7.4%	8.8%	Black--15.1% NH white--6.5%	API--8.9% Black--12.1% Hispanic--7.0% NH white--6.9%	8.5%	-15.91%
Washington	4	Reduce sudden unexpected infant deaths (SUIDs)	Rate of SUIDs (includes deaths attributed to Sudden Infant Death Syndrome (SIDS), Accidental Suffocation and Strangulation in Bed (ASSB) and deaths of unknown cause) per 1,000 births (VSA 2005-2009) (VSA 2006-2010)	***, 10 (Count only)	***, 9 (Count only)	0.93	***	NH black--1.68 NH white--0.69	0.89	
Washington	5	Reduce the teen birth rate	Rate of births to mothers aged 15-19 years per 1,000 teenage female population (VSA 2007-2009) (VSA 2008-2010)	48.5	41.1	27.2	Black--61.8 NH white--38.8	API--3.9 Black--40.1 Hispanic--52.7 NH white--16.6	29.6	50.97%
Washington	7	Reduce child maltreatment	Rate of indicated non-fatal child maltreatment cases reported to social services per 1,000 children under age 18 (DHR 2010) (DHR 2011)	11.4	11.1	5.3	N/A	N/A	4.8	107.70%
Washington	8	Reduce the suicide rate	Rate of suicides per 100,000 population (VSA 2007-2009) (VSA 2008-2010)	13.1	11.4	8.7	NH white--13.1	API--6.2 Black--4.4 Hispanic--2.1 NH white--12.2	9.1	31.29%

County	#	SHIP Objective	Measure Description (Source)	SHIP 2011 County Baseline	SHIP 2012 County Update	SHIP 2012 Maryland Update	SHIP 2012 County Update (Race/Ethnicity)	SHIP 2012 Maryland Update (Race/Ethnicity)	Maryland SHIP 2014 Target	% Difference (Maryland vs. County)
Washington	9	Decrease the rate of alcohol impaired driving fatalities	Rate of deaths associated with alcohol impaired drivers per 100 million vehicle miles traveled (SHA 2009) (SHA 2010)	***, 9 (Count only)	***, 2 (Count only)	0.18	N/A	N/A	0.27	
Washington	10	Increase the proportion of students who enter kindergarten ready to learn	Percentage of children who enter kindergarten ready to learn (MSDE 2010-2011) (MSDE 2011-2012)	76%	78%	83%	Asian--85% AA--66% Hispanic--72% White--80%	Asian--87% AA--79% Hispanic--74% White--88%	85%	-6.02%
Washington	11	Increase the proportion of students who graduate high school	Percentage of students who graduate high school four years after entering 9th grade (MSDE 2009-2010) (MSDE 2010-2011)	89.8%	90.4%	82.8%	Asian--87.5% Black--85.2% Hispanic--84.9% White--91.4%	Asian--92.6% Black--76.1% Hispanic--71.8 White--89.1%	86.1%	9.16%
Washington	12	Reduce domestic violence	Rate ED visits related to domestic violence/abuse per 100,000 population (HSCRC 2010) (HSCRC 2011)	137.0	155.9	107.9	NH black--329.9 NH white--133.8	NH Asian--10.5 NH black--192.2 Hispanic--53.2 NH white--78.9	104.9	44.47%
Washington	13	Reduce blood lead levels in children	Percentage of children less than 6 years old with blood lead levels ≥ 10 µg/dL (MDE 2009) (MDE 2010)	***, 9 (Count only)	***, 6 (Count only)	0.347%	N/A	N/A	0.177%	
Washington	14	Reduce the rate of fall related deaths	Rate of deaths associated with falls per 100,000 population (VSA 2007-2009) (VSA 2008-2010)	11.9	13.0	7.7	NH white--15.0	API--2.9 Black--3.8 Hispanic--2.0 NH white--10.8	7.1	69.32%
Washington	15	Reduce pedestrian injuries on public roads	Rate of injuries to pedestrians per 100,000 population (SHA 2007-2009) (SHA 2008-2010)	26.1	24.2	40.5	N/A	N/A	29.7	-40.21%

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Washington	16	Reduce Salmonella infections transmitted through food	Rate of Salmonella infections per 100,000 population (OIDEOR 2008-2010) (OIDEOR 2009-2011)	***, 17 (Count only)	***, 19 (Count only)	16.7	N/A	N/A	12.7	
Washington	17	Reduce hospital emergency department visits from asthma	Rate of ED visits for asthma per 10,000 population (HSCRC 2010) (HSCRC 2011)	48.7	54.2	59.1	NH black--103.8 Hispanic--78.2 NH white--45.8	NH Asian--12.1 NH black--116.3 Hispanic--32.0 NH white--35.9	49.5	-8.33%
Washington	19	Reduce the number of days the Air Quality Index (AQI) exceeds 100	Number of days the air quality index (AQI) exceeded 100 (EPA 2010) (EPA 2011)	5	3	8.9	N/A	N/A	8.8	-66.29%
Washington	20	Reduce new HIV infections among adults and adolescents	Rate of new (incident) cases of HIV in persons age 13 and older per 100,000 population (CHSE 2009) (CHSE 2010)	***, 13 (Count only)	***, 14 (Count only)	29.8	***	NH black--82.6 Hispanic--20.1 NH white--6.6	30.4	
Washington	21	Reduce Chlamydia trachomatis infections	Rate of Chlamydia infections per 100,000 population (CSTIP 2010) (CSTIP 2011)	309.3	348.8	466.9	N/A	N/A	431	-25.28%
Washington	25	Reduce deaths from heart disease	Rate of heart disease deaths per 100,000 population (age-adjusted) (VSA 2007-2009) (VSA 2008-2010)	208.4	195.4	182.0	Black--145.7 White--198.2	Black--216.8 White--174.2	173.4	7.36%
Washington	26	Reduce the overall cancer death rate	Rate of cancer deaths per 100,000 population (age-adjusted) (VSA 2007-2009) (VSA 2008-2010)	185.4	184.3	170.9	Black--155.3 White--188.0	Black--197.0 White--166.1	169.2	7.84%

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Washington	27	Reduce diabetes-related emergency department visits	Rate of ED visits for diabetes per 100,000 population (HSCRC 2010) (HSCRC 2011)	234.0	279.3	314.6	NH black--419.3 NH white--279.8	NH Asian--46.7 NH black--593.3 Hispanic--94.6 NH white--229.2	300.2	-11.19%
Washington	28	Reduce hypertension-related emergency department visits	Rate of ED visits for hypertension per 100,000 population (HSCRC 2010) (HSCRC 2011)	145.2	164.0	222.2	NH black--371.2 NH white--144.4	NH Asian--53.3 NH black--463.8 Hispanic--54.6 NH white--136.0	202.4	-26.21%
Washington	29	Reduce drug-induced deaths	Rate of drug-induced deaths per 100,000 population (VSA 2007-2009) (VSA 2008-2010)	12.8	12.1	12.6	NH white--13.7	Black--11.2 Hispanic--1.9 NH white--15.7	11.3	-3.89%
Washington	31	Reduce the proportion of young children and adolescents who are obese	Percentage of youth (ages 12-19) who are obese (MYTS 2008) (MYTS 2010)	12.0%	11.5%	11.6%	API--9.8% Black--14.6% Hispanic--15.4% White--10.8%	API--8.4% Black--15.1% Hispanic--13.9% White--8.8%	11.3%	-1.41%
Washington	34	Reduce the number of emergency department visits related to behavioral health conditions.	Rate of ED visits for a behavioral health condition per 100,000 population (HSCRC 2010) (HSCRC 2011)	6,954	7,913	5,522	NH Asian--965 NH black--7,458 Hispanic--3,260 NH white--8,330	NH Asian--644 NH black--6,445 Hispanic--1,370 NH white--6,217	5,028	43.32%
Washington	35	Reduce the proportion of hospitalizations related to Alzheimer's disease and other dementias	Rate of hospital admissions related to dementia/Alzheimer's disease per 100,000 population (HSCRC 2010) (HSCRC 2011)	184.5	197.0	202.9	NH white--227.6	NH Asian--48.8 NH black--224.5 Hispanic--26.5 NH white--237.1	213.7	-2.88%

Maryland State Health Improvement Process (SHIP) 2012 Washington County 7/1/2013

County	#	SHIP Objective	Measure Description (Source)	SHIP 2011 County Baseline	SHIP 2012 County Update	SHIP 2012 Maryland Update	SHIP 2012 County Update (Race/Ethnicity)	SHIP 2012 Maryland Update (Race/Ethnicity)	Maryland SHIP 2014 Target	% Difference (Maryland vs. County)
Washington	36	Increase the proportion of persons with health insurance	Percentage of persons (aged 0-64 years) with any type of health insurance (US Census 2009) (US Census 2010)	87.0%	87.7%	87.3%	N/A	NH black--82.5% Hispanic--55.3% NH white--89.6%	93.6%	0.46%
Washington	37	Increase the proportion of adolescents who have an annual wellness checkup	Percentage of adolescents (aged 13-20 years) enrolled in Medicaid that received a wellness visit during the past year (Medicaid 2010) (Medicaid 2011)	52.2%	51.2%	53.3%	Asian--48.3% AA--53.7% Hispanic--52.6% White--50.7%	Asian--57.7% AA--53.2% Hispanic--65.5% White--49.3%	54.1%	-4.00%
Washington	38	Increase the proportion of children and adolescents who receive dental care	Percentage of children (aged 4-20 years) enrolled in Medicaid that received a dental service during the past year (Medicaid 2009) (Medicaid 2010)	49.7%	60.9%	57.1%	Asian--69.0% AA--63.7% Hispanic--69.3% White--61.5%	Asian--63.3% AA--56.2% Hispanic--64.8% White--55.0%	55.4%	6.63%

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Three-year rolling averages are presented for county-level data for many of the measures. This is an attempt to ensure that counts are sufficient for rate calculation. Data for the state overall is based on a latest available single year for most measures, with the exception of Objective 4, 14, and 29.

***Rates calculated only when sufficient counts for each cell are available.

Only measures in which updated data are available was included.

Percent difference calculated with the following equation:

$$\frac{SHIP\ 2012\ county\ update - SHIP\ 2012\ state\ update}{SHIP\ 2012\ state\ update} \times 100$$

Number of days in which the AQI is greater than 100 for the State of Maryland is the average of all counties in which AQI is available.

Data source abbreviations: CHSE—DHMH Center for HIV Surveillance and Epidemiology, CSTIP—DHMH Center for Sexually Transmitted Infection Prevention, DHR—Maryland Department of Human Resources, EPA—U.S. Environmental Protection Agency, HSCRC—Maryland Health Services Cost Review Commission, MDE—Maryland Department of the Environment, MSDE—Maryland State Department of Education, MYTS—Maryland Youth Tobacco Survey, OIDEOR—DHMH Office of Infectious Disease Epidemiology and Outbreak Response, SHA—Maryland State Highway Administration, VSA—DHMH Vital Statistics Administration

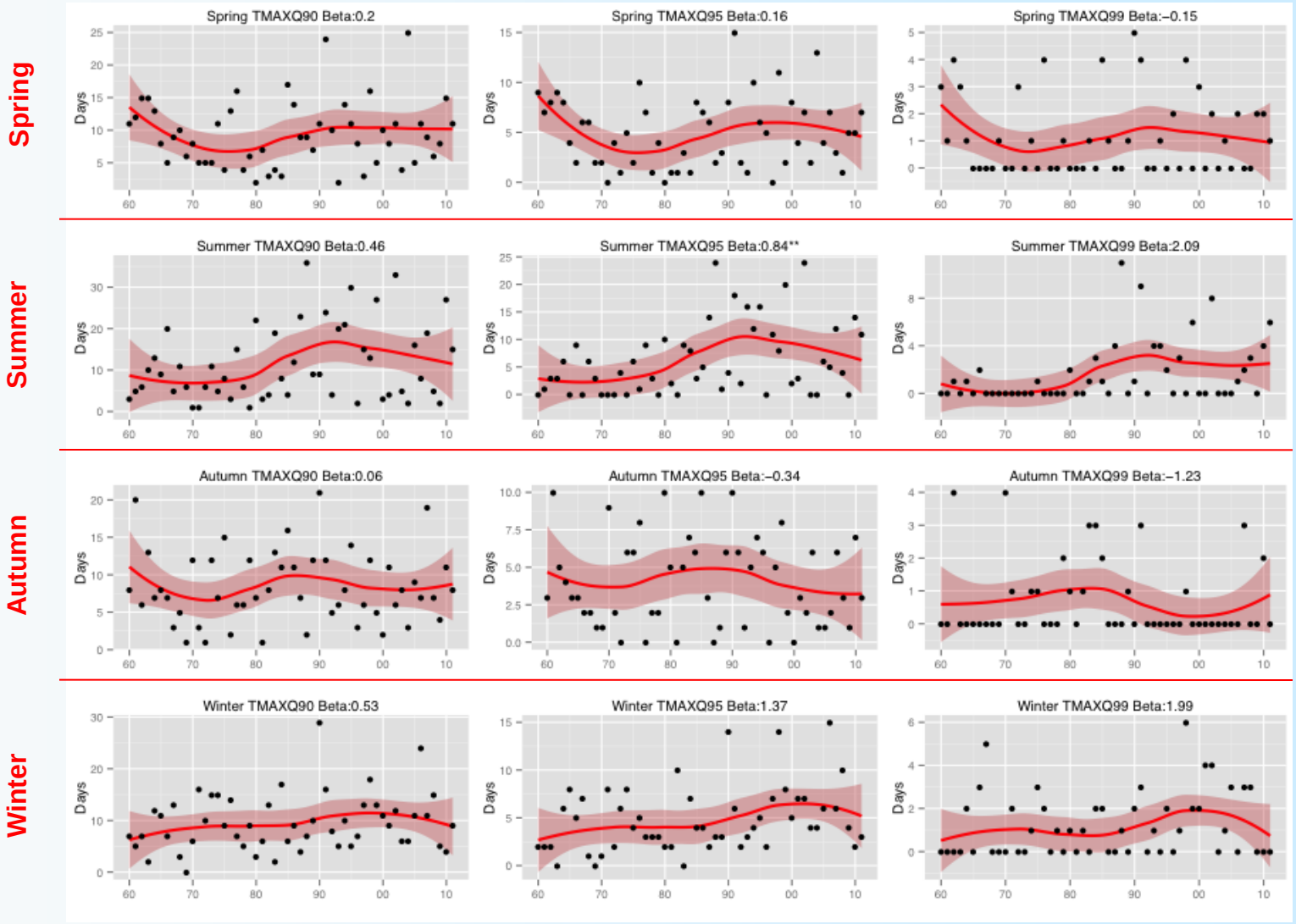
Race/ethnicity abbreviations: AA—African American, AIAN—American Indian/Alaskan Native, API—Asian/Pacific Islander, NH—Non-Hispanic, NHOPI—Native Hawaiian/Other Pacific Islander

Climate Change Projections (Washington County)

Provided by University of Maryland School of Public Health
Amir Sapkota, PhD
Chengsheng Jiang, PhD

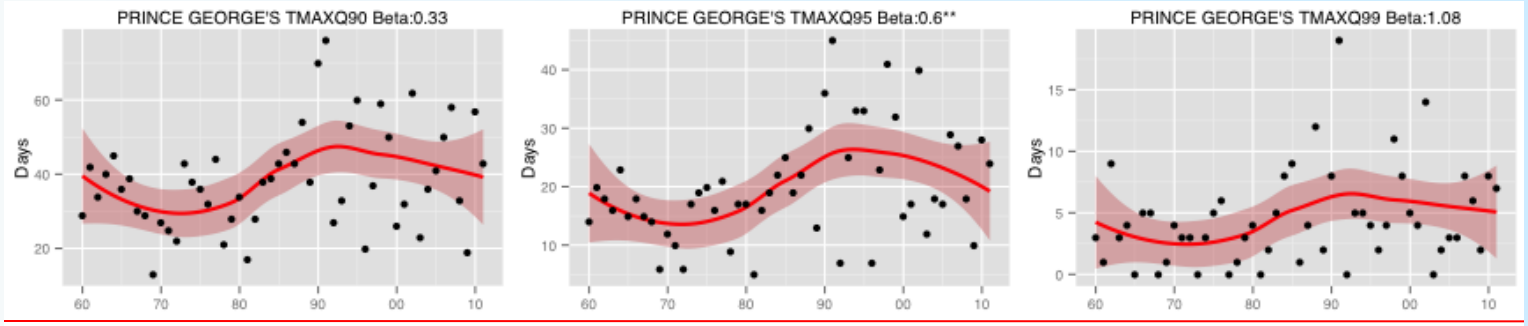
EXCESSIVE HOT DAYS

Seasonal Temperature Anomalies



Annual Hot Temperature Anomalies

Prince Georges



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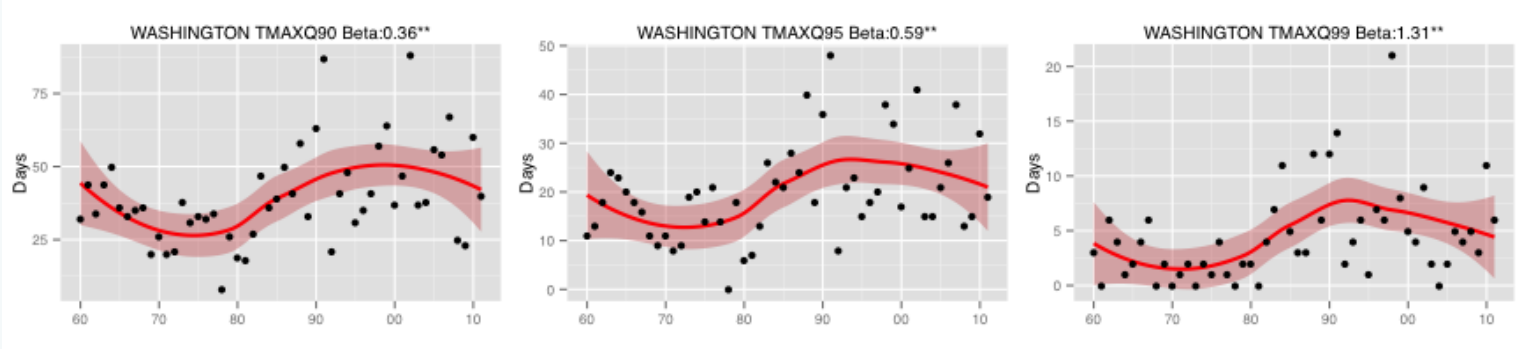
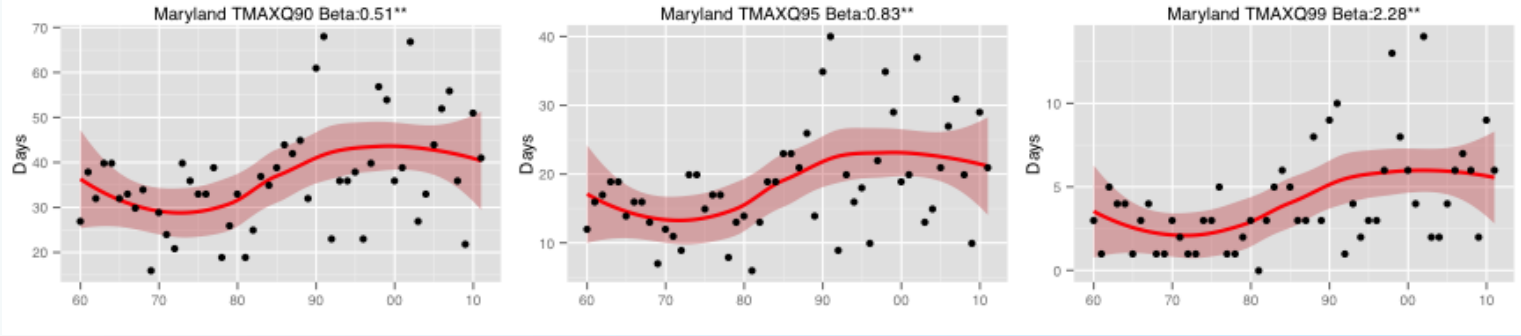


Maryland



Provided by Environmental Public Health Tracking (EPHT)
John Braggio, PhD, MPH
Mickey Wu, MPH

POLLEN INDICATOR

Pollen Indicator Overview

- CSTE/SEHIC Climate Change Indicator for Pollen (Jan 14, 2013)

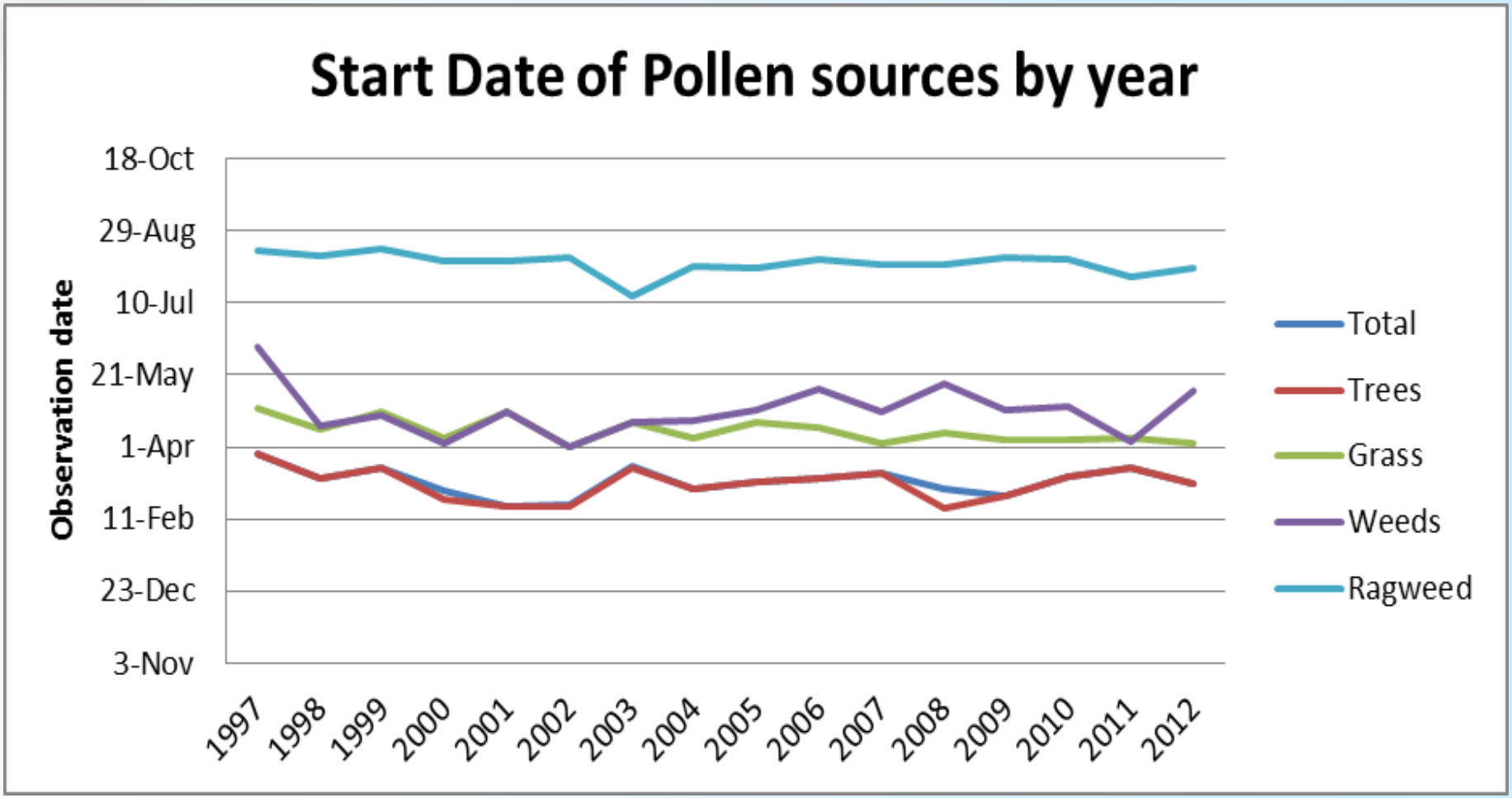
- Significance & Background
  - Pollen can adversely influence respiratory health outcomes, such as asthma
  - Future climate change pollen increases, total spores and selected spore types such as ragweed, could result in an increase in respiratory diseases

- Rationale for pollen indicator development
  - A standardized pollen indicator could be of use to both public health professionals and practitioners through the linkage of pollen with asthma and allergic rhinitis

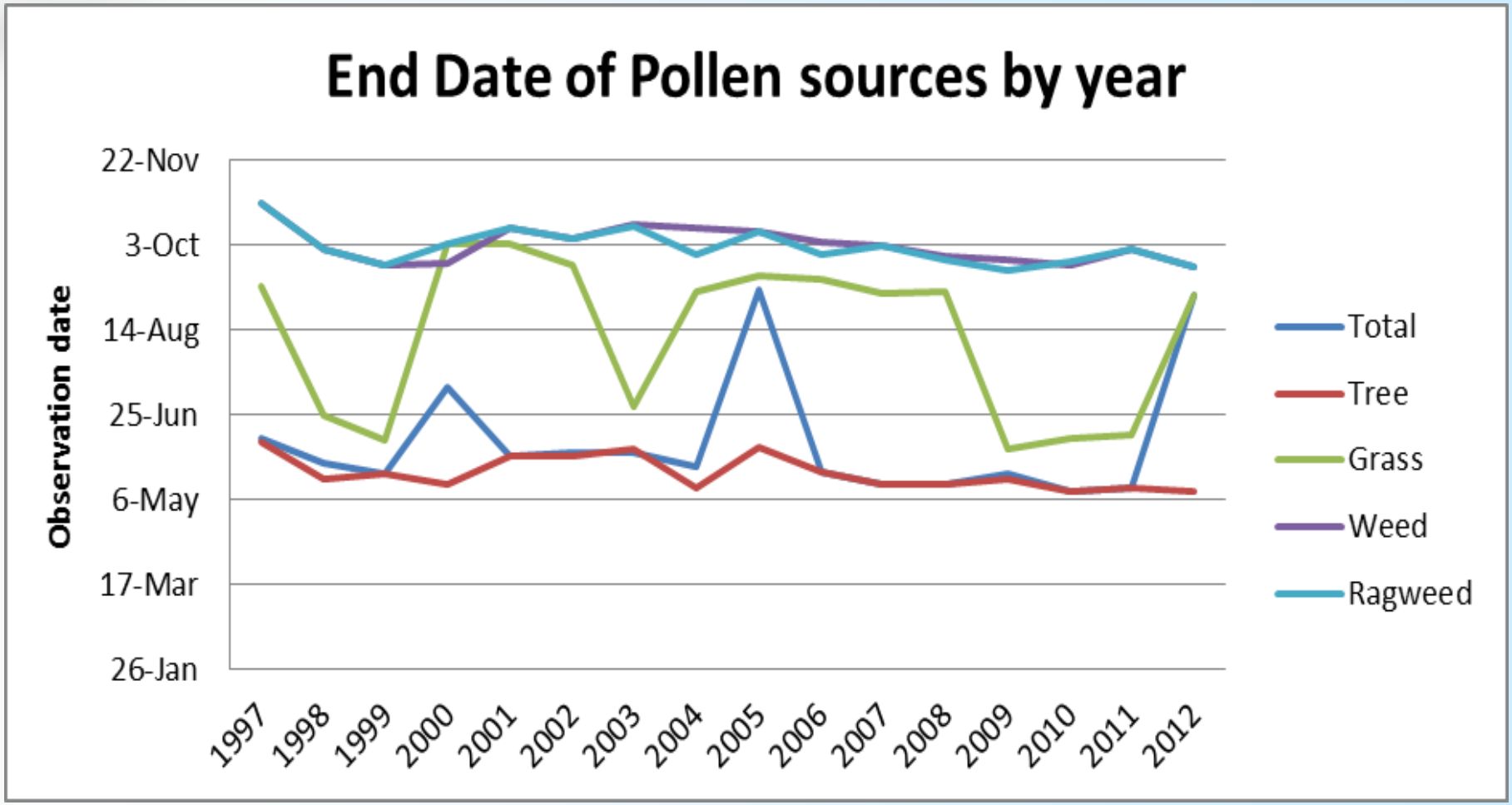
Pollen Indicator Overview, Cont.

- Measure(s)
  1. Date when the pollen season started, by pollen source (i.e., trees, grass, weeds) in a calendar year
  2. Date when the pollen season ended, by pollen source, in a calendar year
  3. Length of pollen season, in days, by pollen source, in a calendar year (#2-#1)
  4. Number and percent of days during the pollen season when pollen readings were categorically elevated (NAB categories of high or very high), by pollen source, in a calendar year
  5. Mean, minimum and maximum daily pollen counts for the pollen season, by pollen source, in a calendar year
  6. Pollen types (species) measured in a calendar year

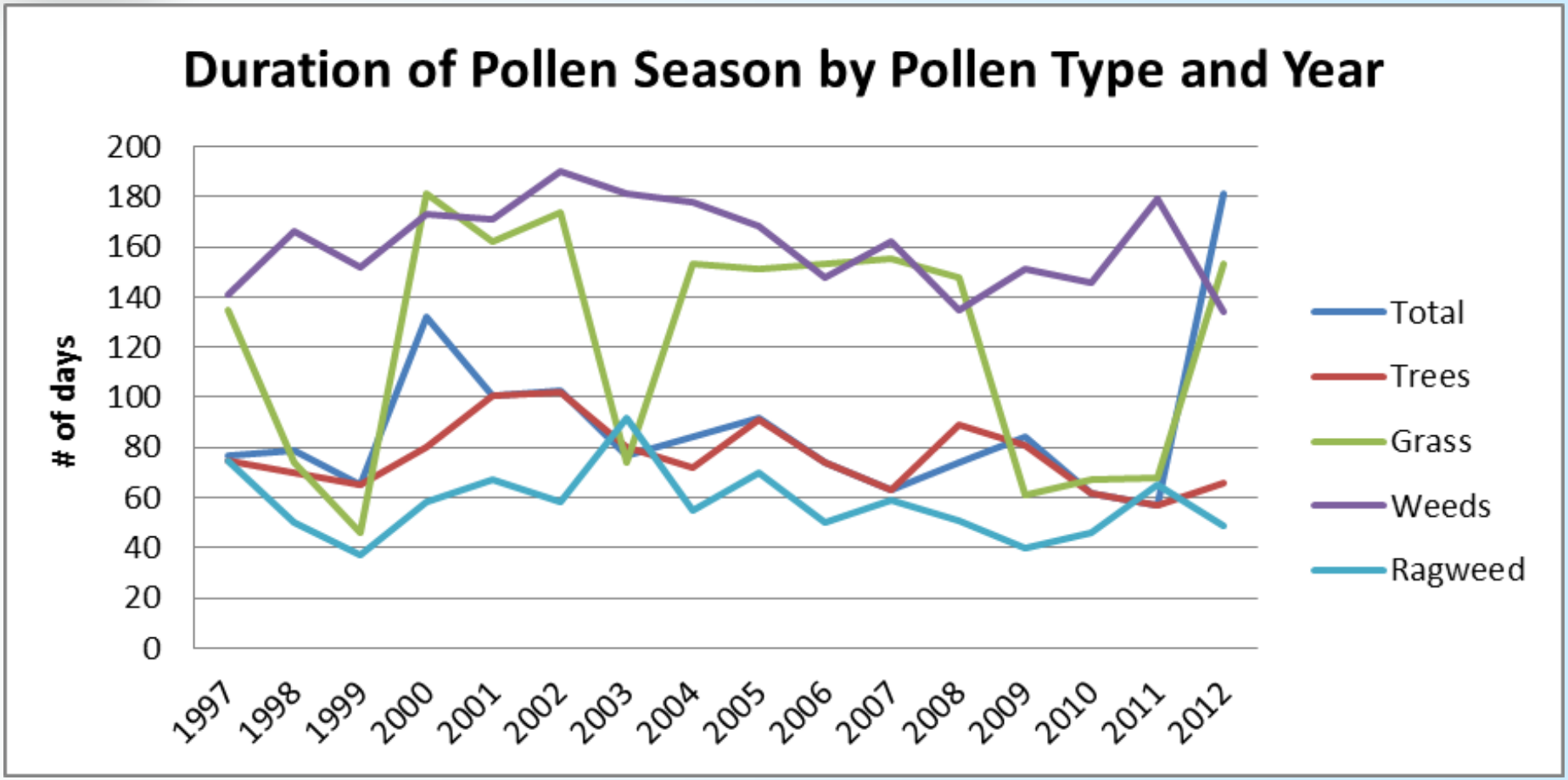
Start of Pollen Season



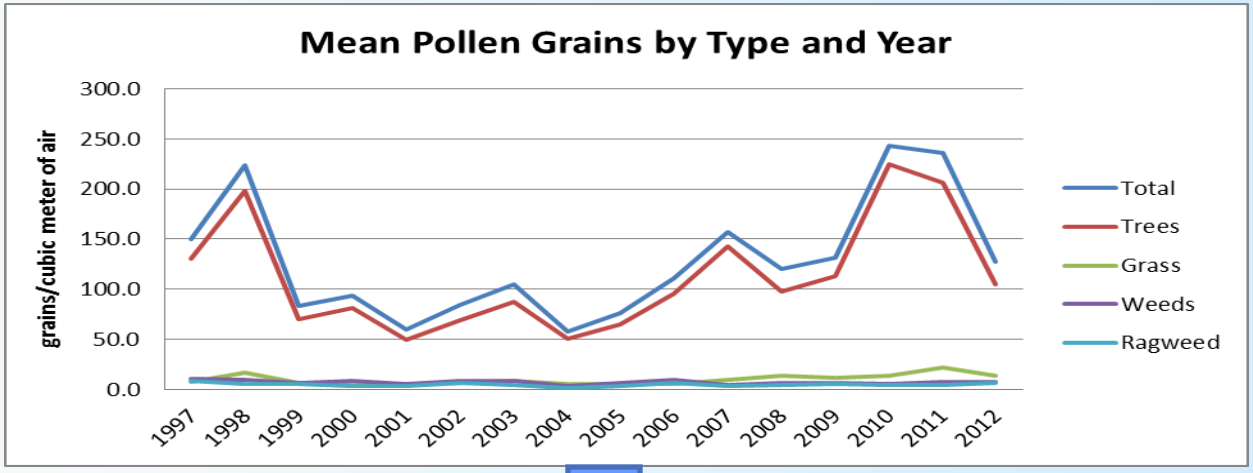
End of Pollen Season

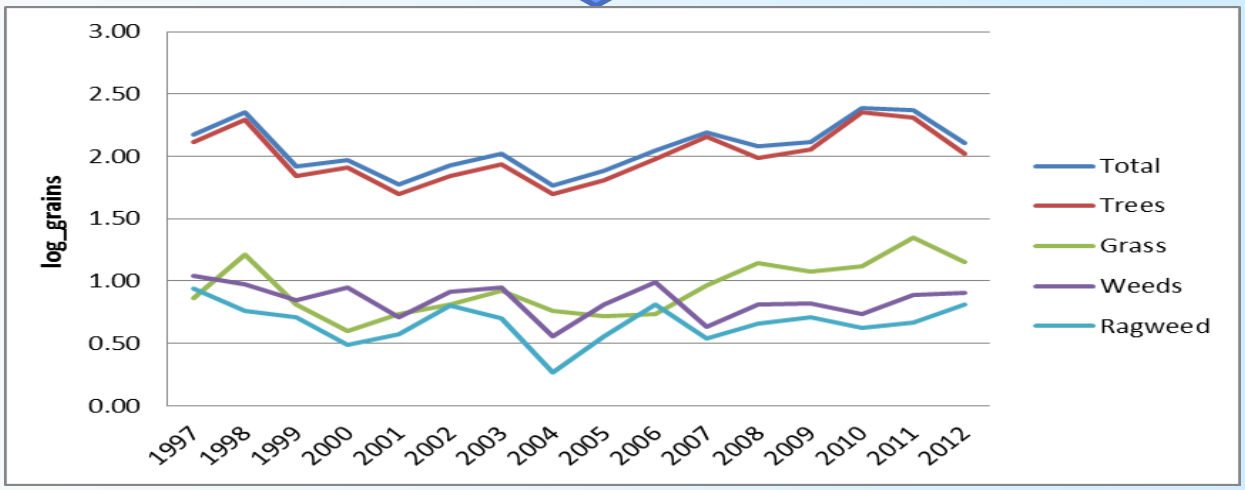


Length of Pollen Season

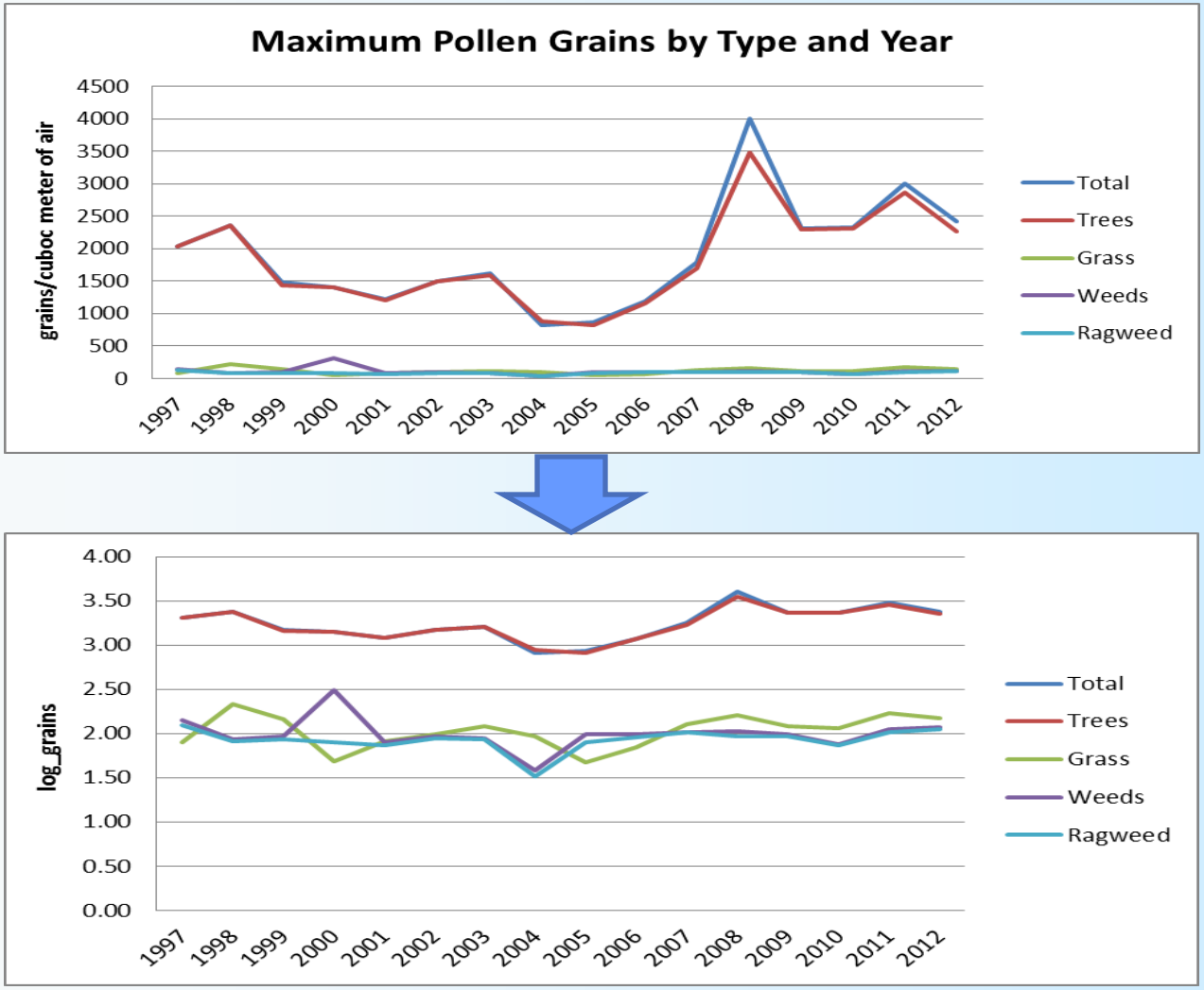


Mean (Log) Pollen Grains by Type and Year





Maximum (Log) Pollen Grains by Type & Year



Correlation between. Pollen and Temperature with and without Controlling for $PM_{2.5}$ and O_3

		Correlation Coefficient			Partial
		Temperature	$PM_{2.5}$	O_3	Temperature
Pollen (Average)	Total	-0.10*	-0.37*	0.13*	-0.35*
	Tree	-0.14*	-0.37*	0.11*	-0.39*
	Grass	0.26*	-0.16*	0.29*	0.07*
	Weed	0.40*	-0.01	0.07*	0.57*
	Ragweed	0.29*	-0.16*	-0.08*	0.58*

* Significant at $p < 0.05$

- Temperature shows a positive correlation with grass, weed, and ragweed pollen, but a negative correlation with total pollen and tree pollen; this could be due to a seasonal effect.
- Temperature itself also shows positive correlation with grass, weed, and ragweed pollen after controlling effect modifiers fine PM and ozone.

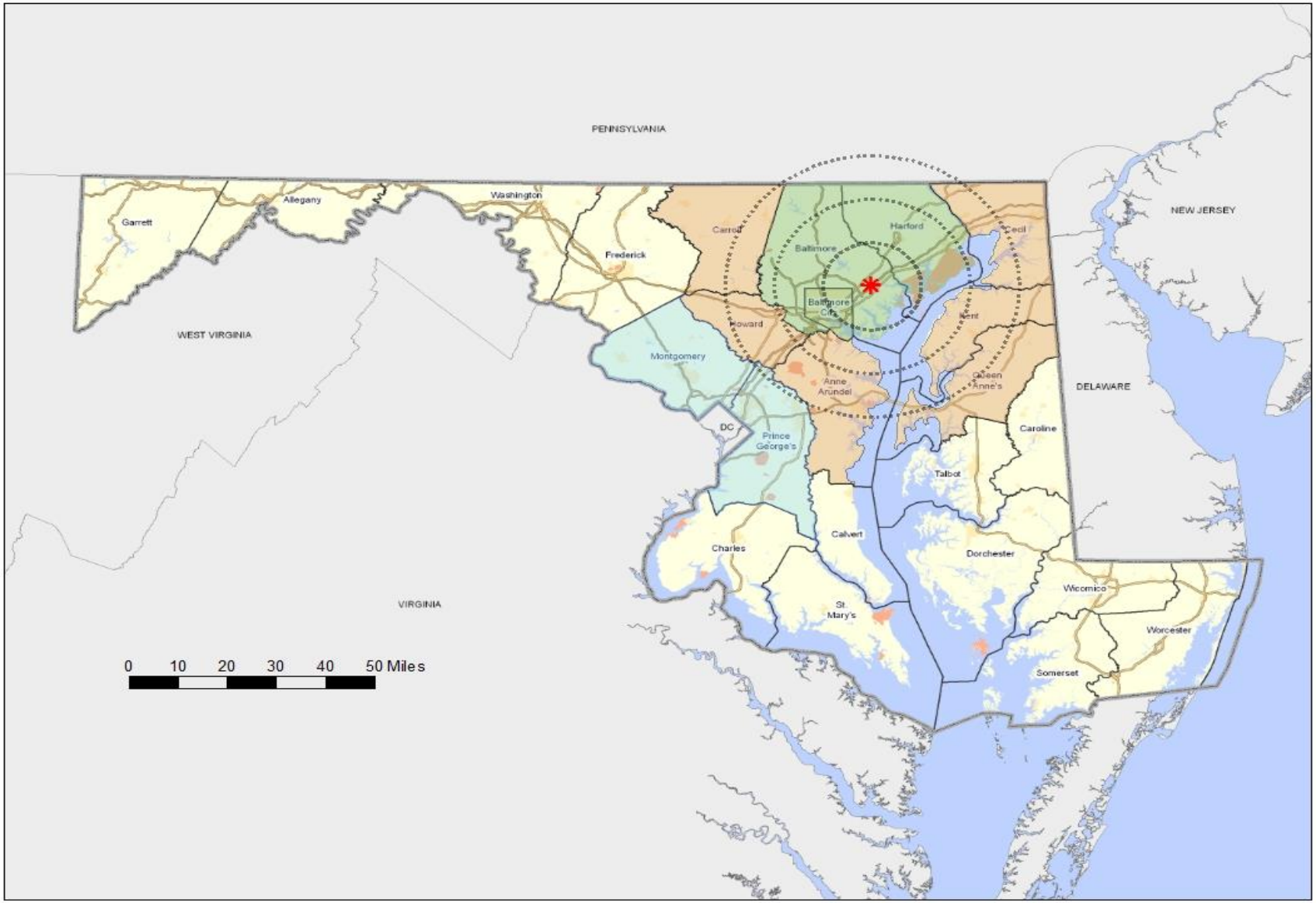
Change in Disease Outcomes

	Asthma			Allergic Rhinitis			Finger wounds		
Year	OR	95% CI		OR	95% CI		OR	95% CI	
2001	1.09	0.95	1.24	5.76*	4.15	7.99	0.86	0.81	0.92
2002	0.99	0.85	1.15	6.86*	5.01	9.38	0.83	0.78	0.90
2003	1.08	0.94	1.25	7.85*	5.78	10.65	0.86	0.80	0.92
2004	1.18*	1.02	1.37	11.04*	8.13	14.99	0.84	0.78	0.90
2005	1.20*	1.03	1.41	10.73*	7.87	14.64	0.80	0.74	0.87
2006	1.10	0.95	1.27	9.18*	6.77	12.45	0.74	0.69	0.80
2007	1.23*	1.06	1.42	9.33*	6.85	12.71	0.69	0.64	0.75
2008	1.06	0.90	1.24	8.17*	5.98	11.16	0.64	0.60	0.70
2009	1.09	0.94	1.28	9.41*	6.90	12.82	0.58	0.54	0.63
2010	1.20*	1.00	1.45	10.17*	7.32	14.11	0.53	0.49	0.59

* Significant at $p < 0.05$

- ORs for Asthma increased annually from year 2003 as compared to year 2000 (ref), especially it had increased significantly in year 2004, 2005, 2007, and 2010.
- ORs for Allergic rhinitis had increased significantly every year since year 2001 as compared to year 2000.

Maryland


PENNSYLVANIA
NEW JERSEY
WEST VIRGINIA
VIRGINIA
DELAWARE
Garrett
Allegany
Washington
Frederick
Carroll
Harford
Cecil
Baltimore
Baltimore City
Howard
Montgomery
Anne Arundel
Kent
Queen Anne's
DC
Prince George's
Caroline
Talbot
Calvert
Charles
Dorchester
St Mary's
Wicomico
Worcester
Somerset
0 10 20 30 40 50 Miles

Distance Effect

	Asthma			Rhinitis			Finger		
	OR	95% CI		OR	95% CI		OR	95% CI	
Distance 0-10	2.81*	2.66	2.97	1.74*	1.65	1.84	1.30*	1.26	1.35
Distance 11-20	1.22*	1.14	1.32	0.86*	0.80	0.92	1.28*	1.23	1.33

Unit: miles

* Significant at $p < 0.05$

- Asthma: OR for distance within 0-10 miles is 2.8 times greater than distance within 21-30 miles (ref), for distance within 11-20 miles is merely 22% greater than distance within 21-30 miles.
- Allergic rhinitis: OR for distance within 0-10 miles is 74% greater than distance within 21-30 miles, but OR for distance within 11-20 miles is 14% less than distance within 21-30 miles.

Discussion

- What else would you want in a baseline vulnerability assessment (e.g., local health priorities?)
- How to think about climate impacts in normal business processes/priorities
- Next steps

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